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EDITORIAL.

A TEST FOR EARLY TUBERCULOSIS.

Having studied the unilateral mydriasis, due to irritation of the sympathetic nerve, which is known to happen sometimes in recent tuberculous lesions of the apex, Sergent concluded that it occurred oftener than was generally thought, as could be observed if it was sought for more systematically. In a recent communication to the French Academy of Medicine he also reported the results of his experiments undertaken with the view of determining whether a latent pupillary inequality could not be made evident by the use of a mydriatic.

He presented a series of fifty cases, some free from lesions and others with either suspected or confirmed lesions, which showed conclusively the practical value of the test.

The method consists in instilling two drops of a 1-1000 solution of atropia in each eye, being careful to apply the same quantity on both sides in the conjunctival sacs, and to make sure that it does not escape. The reaction must be watched closely: beginning in ten to twelve minutes, it increases progressively until it is complete in twenty to twenty-five. When-

ever there is hypersensitiveness of one pupil, it begins dilating before the other, the dilation proceeds more rapidly and reaches its maximum earlier. At the same time the sensitized pupil loses the light reflex and the accommodation reflex some time before the other, a very important point. During the period of the maximum effect of the atropia, lasting from one to three days, both pupils are equally and completely dilated; then the pupil on the sound side begins gradually to return to the normal, while the sensitized pupil remains large and another stage of inequality is noticed, which lasts much longer than that observed after the instillation begins to take effect. Of course, in individuals free from tuberculosis the test proves negative.

There is no danger attached to the measure, provided it is not practiced on aged subjects nor on those suspected of having a tendency to glaucoma. The disturbed vision for one or two days is of no moment and the patient should be warned thereof.

The diagnosis of incipient tuberculosis is of such importance that any means which may aid in settling a doubtful diagnosis should be welcomed. It is to be hoped that Sergent's observations will be confirmed and will prove to be of great value in clinical phthisiology.

THE SOUTHERN MEDICAL ASSOCIATION.

The fifteenth annual meeting of the Southern Medical Association, now the second largest medical organization of the United States, will be held in Hot Springs, Arkansas, on November 14 to 17, 1921, under the auspices of the Garland County-Hot Springs Medical Society and the Arkansas Medical Society.

The railroads have granted a one and one-half fare for the round trip, with tickets on sale beginning November 10, the return limit being November 21. Identification certificates should be secured early from the office of the Association.

The Eastman Hotel will be open only to doctors during the week of the meeting, and will be the headquarters of the Association. There are numerous other hotels of high class, both

on the American and the European plan, so there is no chance of shortage of accommodation.

A fine program is offered, together with the usual receptions, alumni dinners, rides, etc. Additional features will be golf championship games and a boxing contest. The principal attraction, of course, will be the wonderful baths, the Bath House Association having extended the courtesies of their bath houses to the members and their wives.

New Orleans and Louisiana usually send a goodly representation to the meetings of this Association, and we hope this year will not only not prove to be an exception, but will be a banner one as far as attendance from this section is concerned.

THE CHARITY HOSPITAL X-RAY DEPARTMENT.

On October 15 the reorganized and rehabilitated X-ray department of the Charity Hospital was formally inaugurated. It was open to the inspection of invited guests from 3 to 5 in the afternoon and a large number availed themselves of the opportunity to pay it a visit and offer their congratulations to the officers of the hospital, and especially to Dr. Amédée Granger, under whose direction the improvements were carried out, and to whose initiative they are chiefly due.

The various waiting, photographing, fluoroscope, developing and treatment rooms are efficiently and economically distributed and make a fine appearance in their new dress of fine paint. We now have a department we can feel proud of. The staff of the hospital will benefit through the increased efficiency of the department, and will be aided to a corresponding degree in their efforts to help the unfortunates under their care in this State institution.

ORIGINAL ARTICLES.

(No paper published or to be published in any other medical journal will be accepted for this department. All papers must be in the hands of the Editors on the tenth day of the month preceding that in which they are expected to appear. Reprints may be had at reasonable rates if a WRITTEN order for the same accompany the paper.)

A TRIBUTE TO DR. PIERRE ROUANET, THE DISCOVERER OF THE CAUSE OF THE HEART SOUNDS, AT ONE TIME A PRACTITIONER IN NEW ORLEANS.

By EDMOND SOUCHON, M. D., H. F. A. C. S.
Professor Emeritus Tulane School of Medicine.

While strolling in a little quasi-deserted cemetery of a small country town, Thibodaux, La., on Bayou Lafourche, in search of the family tomb of Chief Justice White, I came across the tomb of a celebrated French physician, Dr. Pierre Rouanet, the discoverer of the cause of the heart sounds. I was startled and deeply moved upon reading this eminent name on a blackened, weather-stained, white marble slab affixed to a dilapidated brick tomb. It has stood the rains, storms and suns of seventy-two years.

Dr. Rouanet was born in Languedoc, France, at Labastide, department of Tarn, in 1787, and died in Thibodaux, La., in 1849. Studying medicine, he graduated from the Paris Faculty, his thesis being the remarkable dissertation, "Analyse des bruits du Cœur," a discussion of the heart sounds and their causes, which is now one of the classics of medicine. If I remember well, his theory was that the heart sounds were produced by the closing of the valves (claquement valvulaire). Rouanet was for some time interne in sundry Parisian hospitals, and had already commenced practice when unfortunate speculations on the Bourse destroyed his financial resources and compelled him to seek his fortune in America. Settling in New Orleans, he soon established himself in practice, and from this city he from time to time advanced sums to his friend, Dr. Raymond, for the purpose of reimbursing his broker for the losses sustained by the financial reverses above mentioned. This course was regarded as exceptionally

honorable, as it was not necessary or obligatory in the strict legal sense.

In New Orleans, Rouanet enjoyed a great reputation as a diagnostician in heart-disease, particularly through his skill in auscultation. He was frequently in consultation for cardiac cases, and his diagnoses came to be regarded as infallible, although the therapy of the period was far from efficacious. On account of his great reputation as a cardiac specialist, a number of practical jokes were played upon Rouanet by facetious colleagues. On one occasion the heart of a goose was passed off upon him as the heart of a child, in a series of pathological preparations. Another colleague related this episode in a satirical copy of verses, which were circulated freely in the city and led to a duel with Rouanet, in which both contestants were wounded. At the end, although the seconds declared that honor was satisfied, Rouanet wanted to begin again. Rouanet was an able surgeon as well as internist. I well remember when I was a young student of twenty in Paris, the echoes of the polemics regarding Rouanet's theory.

After practicing medicine in New Orleans for some time, Dr. Rouanet emigrated to a small settlement on Bayou Lafourche, the little town of Thibodaux. He married there Alice Pellegrain, a native of New Orleans, aged 30 years. He was then 41 years old. Two children were issued from the marriage, one daughter and a son. This boy was born in 1820 and became Dr. William Pierre Rouanet. He died in 1853 at the age of 33 years, of yellow fever, and was buried in his father's tomb. He died four years after his father.

Dr. Rouanet lived to be sixty-three years old and died in Thibodaux of hemiplegia in 1849. His full name was Jean Pierre Rouanet.

There is a melancholy shade of the irony of fate in the fact that such a life so brilliantly begun should have ended in such obscurity. *Sic semper gloria mundi.*

It would be an interesting psychological problem for an expert to try to unravel the processes through which the mentality of Rouanet passed, to have induced him to leave a big city where he was prosperous and drift to and finally strand

in a little settlement of a few hundred people such as was Thibodaux eighty-five years ago. The only communication with the city was by steamboat, but only during six or eight months of high water.

It may be that the incidents of his duel may have soured him against the city.

The first half of his life was strenuous enough, but the second part, some thirty years, he spent in the quiet, calm, uneventful life of a country practitioner. I do not believe that one doctor in Thibodaux knew what kind of a man Rouanet was. I am sure he did not condescend to tell them.

The photograph shows the little brick tomb of Rouanet. It is in a dilapidated condition. The surface plastering has been swept away and the mortar between the black bricks is dropping, leaving large cracks. It will not be very long before they crumble down on the mortal remains of our friend Rouanet.

He did not find fortune in New Orleans, it is said. But he did better in Thibodaux. His great-granddaughter writes me that he owned the square of ground on which his house stood, and that the records in the courthouse in Thibodaux showed that he owned a large plantation on the left bank of the bayou. The records of the courthouse in Thibodaux show that in 1842 he mortgaged his house in the town for $1040. It was the finest house in the little town, the first one to be papered inside. It may be that he mortgaged his house to send his son to Paris to study medicine. The son was then twenty-two. However, some old residents of Thibodaux say that he owned a sugar plantation on the other side of the bayou, as already stated.

His only descendant in Thibodaux is a great-granddaughter, Miss Alice Hunt.

Some thirty miles north of Thibodaux stands, on the Mississipi river, the town of Donaldsonville. It is the resting place of another celebrated French physician, Dr. François Prévost, the first in America to perform Cesarian section. It was quite a feat of daring for an obscure country doctor, quite on a par with the pluck and luck of Ephraim McDowell.

Prévost's achievements have been collected in the Reports of the Louisiana Historical Society for the year 1915, in an article by the writer, entitled "Contributions of Louisiana to Medical Science."

It is indeed noteworthy that these great surgical achievements have been done by country doctors: Ephraim McDowell, of Danville, Ky.; Prévost, of Donaldsonville, La., and Marion Sims, of Montgomery, Ala.

I am indebted to the genial and courte.. Thomas Stark, of Thibodaux, La., for obtaining valuable data.

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A CLINICO-PHILOSOPHIC INTERPRETATION OF IMMUNO-THERAPY.

By G. H. SHERMAN, M. D., Detroit.

That many diseases are communicable and that in certain diseases one attack renders the individual subsequently immune has been known since the dawn of medicine; but it was left to our generation, through the development of the science of bacteriology, to ascertain the causes of transmitted disease and the nature of the immunizing mechanism. Bacteriology has demonstrated that a surprisingly large proportion of our diseases are caused by the ever-present germs and that health

is maintained only by the workings of some defensive properties, inherent in all living tissues, which resist the attacks of pathogenic bacteria. The basic principle of vaccine therapy is this production of immunity, and its aim is to take advantage of nature's immunizing methods and to utilize them for prophylactic and curative purpose.

Anti-Bacterial Substances of the Blood.—Extensive research work on lower animals by numerous investigators has quite accurately determined the presence of anti-bacterial substances in the blood. Buchner, Nutall and others found that fresh normal blood serum has a bactericidal power, dissolving to a limited extent many kinds of germs. Park showed that as many as 30,000 germs per cubic centimeter of fluid will all be destroyed by 0.1 c. c. mil. of normal blood serum incubated at 98.1 degrees F. for 27 hours. When 100,000 germs are added to the same amount of serum, the number of germs will be very much diminished during the first and second hours of incubation; but if the process of incubation is continued for 27 hours, the number of germs is materially increased, the remaining live germs having multiplied. This shows that normal blood serum contains a substance that is consumed while destroying germs, and that if there be any germs left after this substance is consumed they will at once multiply without further hindrance.

Ehrlich and Morgenroth found that this bactericidal power of fresh blood serum is due to the presence, in very minute quantities, of a variety of substances termed "anti-bodies," which combine with another substance called "the complement," present in comparatively large amounts. These anti-bodies fit a large variety of organisms, but when an animal is immunized to some specific organism the anti-bodies corresponding to that organism are enormously increased, while the amount of complement present remains practically stationary.

Since the germ-destroying power of the blood depends on the combination of the anti-bodies with the complement, it can readily be seen that in cases of advanced infections the immunizing process may be retarded from a deficiency in complement.

Longcope (*University of Penn. Med. Bulletin*, 1902, XV, 331), in an investigation of the complement content of the

blood in infectious diseases in general, has found that the complement is constantly low, and is diminished still more when septic complications intervene.

Gay, Perkins, Thompson (*Jour. Med. Research*, 1903, X 196), found a diminished bacteriolytic complement constant in variola. Wassermann suggests ("*Immune Sera*," by C. F. Boulduan, 1911, p. 81) that the curative power of many bactericidal sera might be increased by the simultaneous injection of the sera of certain normal animals in order thus to gain an increased amount of complement.

In infections caused by exotoxic organisms such as the diphtheria and tetanus bacilli, distinct anti-toxins are formed as the principal immunizing factors. In the infections caused by the endotoxic pus group of organisms, of which the streptococci, pneumococci, staphylococci, colon bacilli and typhoid bacilli are the most important, the immune body or amboceptor expresses itself in the form of agglutinins, lysins, precipitins, etc.

Metchnikoff found that the white corpuscles play an important role in the immunizing process as phagocytes or "devouring cells," having the power to take up germs and destroy them by a process of digestion.

The Opsonins.—Sir A. E. Wright, of London, following up Metchnikoff's work, found that the phagocytic power of the white corpuscles was very low or almost entirely negative unless they were suspended in blood serum, and that when the corpuscles are suspended in blood serum obtained from previously immunized animals their phagocytic power is much greater than when they are suspended in ordinary serum. He also found that this phagocytic power is specific, it only appearing when the same kind of germs that the animal was immunized with are used in the experiment. This is the fundamental principle of this subject. From these investigations Wright concluded that the blood serum contains a substance which has a sensitizing effect on the invading organism, and that this substance is naturally increased during the immunizing process. This bacteriotropic substance he termed "opsonin" (Greek, Opsono, I prepare food for). It was this phagocytic power of the blood, as demonstrated in the incu-

bated test tube, that led Wright to make extensive investigations as to the opsonic power of the blood in man under various conditions. A measurement of this power he calls the "opsonic index."

Wright, in a paper published in *The Lancet*, March 29, 1919, introduces some new words for the purpose of designating certain conditions in infectious processes, and, to get his ideas presented clearly, will quote him as follows:

"To combat bacterial infection the organism must have defensive powers. That power of guarding itself against infection we may—the suggestion is Lord Moulton's—call phylactic power. The leucocytes and the bacteriotropic substances in the blood fluids we may call phylactic agents. But phylactic power in the blood will not be all that is required. Military similes become stale; but let me here just indicate that the requirements for the defense of a state are not limited to the possession of a standing army. There is required also efficient staff work to bring your defensive force to the point attacked. The self-same thing applies to the body. You must have not only phylactic power in the blood, but also provision for the transport of your leucocytes and bacteritropic blood fluids to the site of infection. Let me call this transport of phylactic agents to the site of infection kata-phylaxis. (You have a similar use of the prefix kata in cataplasm and kataphoresis); and let me term any condition which interferes with that transport an anti-kataphylactic influence."

"Now in the body, when in sound physiological condition, we have efficient kataphylactic arrangements—blood fluid and leucocytes have unrestricted access to every portion of the body. But when anti-kataphylactic influences are brought to bear, when the arterial supply is interrupted or is closed down by collapse, or the body is petrified by cold, and the alkalinity of the lymph is blunted off by acid metabolites derived from the muscles, then the emigration of leucocytes is arrested and the transport of blood fluids into the tissues comes to a standstill. And with that all pathogenetic microbes which may find entrance—even microbes like gas-gangrene bacilli which grow with immense difficulty in the healthy blood fluids—flourish unopposed.

"Phylaxis and kata-phylaxis—these are the normal defenses of the body. But there are also resources in reserve. By a process comparable to a mobilization for the reinforcement of a standing army, the phylactic powers of the blood fluids can be increased. We may call that epi-phylactic reinforcement, or epi-phylactic response. Such epi-phylactic response manifests itself, as you know in connection with, we may say, all infections that give rise to constitutional disturbance. And such response follows, as you know also, upon bacterial inoculations when conducted with appropriate doses. But, as I pointed out already in connection with one of my first batches of experimental anti-typhoid inoculations, there follows directly upon the inoculation of a large dose always a phase of diminished blood resistance; I called it a negative phase. It would be more conformable to the system of terminology I am advocating to employ here the term 'apo-phylactic phase.'

Ec-Phylaxis.—"We now come to something which is much less familiar, but, I think, even more important.

"I have in view here conditions which I drew attention to twenty years ago in connection with typhoid and Malta fevers, coining for my propagandist purposes the terms 'regions of diminished bacteriotropic pressure, non-bacteriotropic envelopes.' These terms may perhaps have been unsuccessfully coined; they have, at any rate, not proved effective missionaries of the idea, and I would propose now to try to put into currency instead the terms 'ec-phylaxis, ec-phylactic region, and ec-phylactic envelope.' When I speak of an 'ec-phylactic region' you will understand me to mean a region in which guardian elements of the blood have been rendered impotent, or, as the case may be, have been excluded. A moment ago, in describing the effects produced by the abolition or suspension of the circulation by injury to the blood-vessels or exposure to cold, I was picturing to you an ec-phylactic region. Much more commonly—and these, of course, are the conditions I described in typhoid and Malta fevers—the ec-phylactic region has been fabricated by a bacterial colony. You will appreciate that every living bacterial colony must become the center of an ec-phylactic sphere. It will become so (a) by radiating out toxins which will (when of sufficient strength) repel leucocytes; (b) by absorbing bacteriotropic substances from the blood fluids; and, probably, (c) by abstracting anti-tryptic power from the blood fluids and so converting these into a congenial culture medium."

The enzyme or ferment theory of immunization, as worked out by Vaughan, Freidberger, Abderhalden and others, has become quite firmly established. This theory leads us to the most essential factor of life—digestion; and digestion depends on the presence of enzymes or ferments, because it is by means of these ferments that food substances are prepared, really dissolved, so they may be absorbed and assimilated. In the more highly developed forms of life the digestive organs are set aside for this purpose. Single cell organisms, on the other hand, are so constituted that all the functions of life are contained within the one cell. The single-cell organism lives and grows by absorbing and assimilating food substances with which it comes in contact. Where necessary, the germ secretes ferments from its surface for the purpose of digesting or dissolving this food so that it can be absorbed and assimilated, thereby carrying on its life function.

Of the various foods or substances that sustain life, protein occupies the most important position, because tissue cells as well as single cell organisms are principally of protein composition. In fundamental construction all proteins, whether of animal, vegetable or germ origin, are essentially the same; but animal as well as vegetable and germ proteins, obtained from various species, differ from one another in some specific character. The protein obtained from the blood serum of one

species of animal cannot be injected into the blood of some other species without producing serious physiologic disturbances. Horse serum protein, when injected into a guinea-pig, will produce certain definite physiological disturbances, and the same is true when horse serum is injected into man. Egg-white, and in fact all abnormal proteins, whether of animal, vegetable or germ origin, will produce the same disturbance under the same conditions. These disturbances were first observed as a result of animal experimentation in the production of anti-diphtheritic serum and are now known as protein poisoning or anaphylaxis. An enormous amount of experimental research work has been done on this phenomenon of anaphylaxis and its relation to infectious diseases, and to comprehend the enzyme theory of immunization it is necessary to briefly bring forward its most important factors.

Of all animals, the guinea-pig has been found to give the most marked and most constant symptoms of protein poisoning, and for this reason is well adapted for studying this phenomenon.

Kolmer ("Infection, Immunity and Specific Therapy," 1915, p. 537) says:

"Horse serum, when injected into normal guinea-pigs, gives rise to no symptoms. As much as 20 c. c. may be injected into the peritoneal cavity, and small amounts may even be injected into the brain, without causing any untoward symptoms."

"When a small dose of serum is injected intravenously, intraperitoneally, or subcutaneously, and ten days later a second injection is made, the animal develops symptoms of acute anaphylactic asphyxia, which, in the majority of instances, terminates fatally. In five or ten minutes after injection the pig becomes restless and then manifests indications of respiratory embarrassment by scratching at the mouth, coughing, and sometimes of spasmodic, rapid or irregular breathing; the pig becomes agitated, and there is a discharge of urine and feces. This stage of exhilaration is soon followed by one of paresis or complete paralysis, with arrest of breathing. The pig is unable to stand, or, if it attempts to move, falls upon its side; when taken up it is limp; spasmodic, jerky and convulsive movements now supervene. This chain of symptoms is very characteristic, though they do not always follow in the order given. Pigs in the state of complete paralysis may fully recover, but usually convulsions appear and are almost invariably a forerunner of death. Symptoms appear about ten minutes after the injection has been given; occasionally in pigs not very susceptible they are delayed 20 to 45 minutes. Animals developing late symptoms are not very susceptible and do not die. Death usually occurs within an hour, and frequently in less than 30 minutes. If the second injection be made directly into the brain or circulation, the symptoms are manifested with explosive violence, the animal frequently dying within two or three minutes."—**Rosenau.**

The same symptoms would develop from inoculating guinea-pigs with egg-white or other animal or vegetable proteins in the same way, but no symptoms of anaphylaxis will develop unless the same kind of protein is employed in the first and subsequent inoculations. Vaughan ("Protein Split Products in Relation to Immunity and Disease," chapter V) succeeded in splitting up various kinds of animal, vegetable and germ proteins by means of sodium hydroxide and absolute alcohol, and in this way obtained a substance constituting about one-third the original protein treated, which, when injected intravenously into guinea-pigs in 0.5 to 5 or more mg. doses, produces characteristic anaphylaxis with symptoms identical to those produced by serum inoculations.

Concerning the splitting of protein by ferments, Kolmer ("Infection, Immunity and Specific Therapy," 1915, p. 550) says:

> "In 1910 Friedberger, by digesting a serum precipitate with normal guinea-pig sera, obtained a similar toxic substance; by means of ferments he secured a protein cleavage poison which, when injected into normal guinea-pigs, produced the symptoms of acute anaphylaxis, the process being entirely analogous to that obtained by Vaughan and Wheeler by protein splitting with alcoholic sodium hydroxid solution. Subsequent studies by Friedberger and his collaborators showed that similar protein poisons could be obtained by digesting micro-organisms, as Bacillus prodigiosus, Bacillus typhosus, and Bacillus tuberculosis, with normal guinea-pig serum. Friedberger and Nathan obtained the poison by digesting agar with fresh serum; Dold and Aoki, by digesting meningococci, streptococci, pneumococci, gonococci, and various other micro-organisms with fresh normal guinea-pig serum. As was expected, cleavage could be facilitated and hastened by using immune serum specific for any particular bacterial or other protein."

These experiments show that poisonous substance may be obtained from animal, vegetable or germ protein by disrupting the protein molecule with chemicals or by digesting it with blood serum. Normal blood serum contains a small amount of this digestive substance, which has been called "alexin," "anti-body," and by other names. This substance will digest a variety of proteins, more particularly germ proteins, and constitutes the normal non-specific germicidal substance contained in the blood which is now regarded as a non-specific proteolytic ferment. When an abnormal protein gains entrance to the blood or tissues of the body which is not readily digested and disposed of by this non-specific proteolytic ferment, a

protest in tissue cell activities develops with the production of a specific digestive substance which digests the abnormal protein. From our present knowledge, this substance should be classed as a specific proteolytic ferment or enzyme specially prepared by tissue cells for this particular emergency. When this condition has developed the animal is said to be sensitized to that particular protein whether of animal, vegetable or germ origin. This sensitizing process starts from developing and accumulating a comparatively large amount of this specific proteolytic ferment. If a considerable amount of the same kind of protein to which an animal has been sensitized is injected after this ferment accumulations has taken place, sufficient specific proteolytic ferment is present in the body fluids to rapidly digest the injected protein and liberate so much of its toxic portion that poisonous symptoms develop. In other words, the animal has become highly immunized to that protein. Whatever the ultimate explanation of immunization may be, it is perfectly evident that protein sensitization with the development of specific ferments by tissue cell activities does take place.

The amount of serum necessary to sensitize a guinea-pig is surprisingly small. Rosenau and Anderson found a guinea-pig that was sensitized by 0.000,0001 mil. As a rule, they used less than 4.004 mil. in their experiments. Besredka places the minimum amount necessary to secure uniform results at 0.001 mil., whereas 0.0001 mil. proved sufficient in a considerable percentage of animals. The sensitizing dose of horse serum ordinarily employed in experiments upon guinea-pigs is 0.01 mil.; amounts ranging from 0.001 mil. to 1 mil. are ordinarily followed by an incubation period of from ten to sixteen days. Large doses also sensitize, but a longer incubation period is required. In order to produce a fatal result, a second or intoxicating dose must be considerably larger than the minimum sensitizing dose, the proportion between the two having been placed by Doerr and Russ as 1.1000; i. e., if 0.001 mil. of serum is injected intraperitoneally in order to effect sensitization, 1 mil. injected by the same route ten or twelve days later would in all probability kill a half-grown guinea-pig, whereas 0.1 mil. subcutaneously would be followed by serious symptoms.

The knowledge obtained from studies of protein poisoning throws much light on the problem of infection and immunization. When an infection takes place, germs multiply in the tissues and fluids of the body, and, to the extent of their growth, a foreign protein is developed within the body. Here the non-specific proteolytic ferment, normally present in the fluids of the body, evidently was not sufficiently active as a foreign protein digestant, otherwise the infection could not have taken place; and, consequently, a reserve force of tissue cell activity is called out for the purpose of producing a specific ferment which digests or exerts some destructive influence on this foreign germ protein. In other words, the tissues are becoming sensitive to this particular germ protein. After sensitization has taken place, the protein molecule of the germ is disrupted, thus liberating its toxic radicle which gives symptoms of disease. In fact, Vaughan contends that all symptoms as a result of infection are principally due to this protein poisoning, and that the main difference in the clinical manifestations of various diseases is due to the parts of the body or organs involved. This contention has received much support, but it has by no means at any time been generally accepted.

Others contend that germs, more particularly the staphylococci, streptococci, pneumococci, colon bacilli, typhoid bacilli and similar organisms, contain endotoxins, and that symptoms of disease develop after the germs become disintegrated in the course of an infection and thus the endotoxin is liberated. Neither of these contentions would account for the symptoms found in many rapidly progressing infections. Both the endotoxin and the split protein theory, as to the liberation of poisonous substances, assume that germ destruction is going on extensively where intense inflammatory and other toxic symptoms exist, while rapid germ development is also taking place at the same time. It is hard to reconcile these two factors. A cultural condition where germ destruction is progressing rapidly is never favorable for germ growth at the same time. Kolmer, in discussing the question regarding the source of poisonous symptoms ("Infection, Immunity and Specific Therapy," p. 570), says: "Likewise in such infections as typhoid fever and pneumonia, I cannot eliminate the action

of true toxins and endotoxins, and ascribe all the symptoms to the protein poison or anaphylatoxin. It is not always true that the incubation period is devoid of symptoms. Mild and evanescent symptoms are frequently present, and it is but natural to ascribe these to the effects of bacterial products themselves. After a time, when the bacteria have multiplied and reached special tissues, the symptoms become more intense and the typical lesions are produced. These may be ascribed to the result of the combined action of toxins themselves and the protein poison, rather than to the protein poison itself to the entire exclusion of the metabolic products of the bacteria. In the present state of our knowledge it is, of course, very difficult to decide which symptoms in a given disease are due to bacterial toxins, which to endotoxins, which to ptomaines, which to mechanical action of the bacteria, and which to the protein poison or anaphyla-toxin. While it is perfectly true that we cannot understand symptoms as due to protein poison that cannot be ascribed entirely to toxins and endotoxins, it seems to me unwise to ascribe all lesions and symptoms to the toxins on one hand or the protein poison on the other."

The Digestive Ferments Produced by the Germs.—In speaking of toxins in this connection, I take it that Kolmer refers to substances which are produced by the germ, not a part of the germ structure.

Virulent infections, where germ multiplication and tissue disintegration are going on rapidly, show that activities by the live organism in maintaining its development and growth are important, if not the most important, factors of such infections.

Vaughan ("Protein Split Products in Relation to Immunity and Disease," p. 208), in his experimental work, found a pneumococcus so virulent that 0.000,001 c. c. of a 24-hour bouillon growth would kill a half-grown guinea-pig when injected intraperitoneally, while it required 1 c. c. of a regular stock culture to kill a pig similarly inoculated in the same length of time. In explaining the virulence of this organism, he says: "Virulence may depend on several factors, but rate of multiplication is certainly one of them, and on a common medium as the animal body this must depend on

the effectiveness of the ferments whose function it is to prepare and utilize the pabulum on which the organism feeds." Here special emphasis is placed on ferments secretion by the pneumococcus as a means of digesting its food for assimilation, and that by efficient digestion and assimilation rapid growth and multiplication is made possible. Where such a pneumococcus infection is localized, this germ-produced ferment necessarily has a devitalizing or destructive influence on the involved tissue.

Simon ("Infection and Immunity," p. 33), in referring to difference in virulence of infecting organisms, says: "Two possibilities naturally suggest themselves, which may be operative either individually or conjointly. On the one hand we may imagine that an organism, when introduced into the body of an animal which seeks to destroy the invader, adjusts itself to its new surroundings by certain changes of a morphological or physiological character, in consequence of which it becomes relatively or absolutely unassailable by the offensive forces of the host, unless, indeed, it already possesses such properties during its saprophytic existence outside of the body. On the other hand, we can conceive that the infecting organism actively secretes material which tends to counteract or even to destroy the opposing forces of the host."

Rosenow (*Journal A. M. A.*, Sept. 7, 1912) demonstrated that pneumococci, during a process of autolysis in normal salt solution, produce a substance which has a very toxic influence, and when injected into animals induces no immunizing responses, but rather paralyzes the immunizing forces. He found that pleuritic effusion in cases of pneumonic empyema and pneumonic lung tissue also contain this toxic material. From this he concludes that during the process of toxic pneumonias a continuous autolyzing process of the pneumococcus takes place with the production of this toxic material which plays no part in bringing about an immunity, but rather hinders anti-body formation. I have good reason to believe that this toxic material is the result of ferment activities by the pneumococcus. A virulent streptococcus infection offers a good illustration.

Some years ago, before vaccine therapy came into use, I was called to treat one of these cases. This was a middle-

aged woman of previous good health. While darning at 2 o'clock in the afternoon she pricked her thumb with the needle and soon after felt a distinct irritation associated with pain. Four hours later, when I was called to see her, she was suffering with severe pain in the thumb. The thumb was swollen, tender to the touch, and had a somewhat distinct cyanotic appearance. It was only by careful examination that the place where the needle entered could be found. The physical injury amounted to nothing, and I could hardly imagine that so much inflammation could develop from infection by a needle-prick in so short a time, and concluded that a felon was developing and the needle prick was merely coincident. About 8 o'clock that same evening I was again asked to see the patient on account of severe pain in the thumb. I did not call, but prescribed some morphine. The next morning there was no longer any question about the needle-prick being the source of the trouble. There was a distinct area of intense inflammation with indications of necrotic tissue development where the needle had entered. A red lymphatic chain had developed which extended to the shoulder-joint. The lymphatic glands at the elbow were enlarged, and besides other symptoms of a virulent toxic infection there was a temperature of 102.5 degrees F. The condition was recognized as a case of streptococcus infection, and this was later verified by bacterial examination. Here germ development was evidently going on very rapidly. Necessarily, the number of germs that were inoculated with the darning needle must have been comparatively small, but localized toxic symptoms developed soon after the inoculation. If it had been true that these poisonous substances which caused tissue irritation and inflammation were due to split proteins or endotoxins from destroyed germs, it is impossible that germ multiplication could have progressed as rapidly as the inflammatory extension indicated. To assist in overcoming this infection, 40 c. c. of antistreptococcus serum were given at once; but before the progress of the infection was overcome, a necrotic piece of tissue sloughed out where the needle had entered, extending almost to the bone and about three-eighths of an inch in diameter. The most logical explanation concerning the rapid germ development in this case is that the

germs produced some substance that had a destructive or devitalizing influence upon the tissues in the infected area which aided the germs in their growth and multiplication, but did not have any material influence in stimulating cell activities toward producing immunizing substances. Every practicing physician has seen these cases of severe infection, and where immunotherapy has not been applied he has almost invariably seen them run a prolonged course and frequently a fatal termination.

It is reasonable to assume that germs have no intent or purpose in their development. They simply grow and multiply if the environment of the place in which they happen to lodge is suitable for their maintenance. When they gain entrance to the tissues or fluids of the animal body, they must utilize substances with which they come in contact for nourishment, and if such substances are not suitable for their sustenance they must die. Germs, being single-cell organisms, obtain their nourishment by absorbing and assimilating substances with which they come in contact and build them into their cell structure. Since the tissues of the animal body are different in bio-chemical construction than that of the invading germs, the tissue substances which germs utilize must be changed before the germ can absorb and assimilate them. This the germs accomplish by secreting ferments from their surfaces which digest and prepare the food with which they come in contact for absorption and assimilation. In other words, the germ digests its way into the tissue which it invades. The digestive substance or ferment with which the germ surrounds itself is really the only means of defense which it possesses. By means of this digestive ferment the germ resists attacks by leucocytes. Leucocytes coming in contact with germs possessing active ferments surrounding them find them too toxic, so, instead of making an attack, the leucocyte retreats; consequently, instead of having a positive chemotoxis we have a negative chemotoxis, and the germ continues to grow and multiply. The germ tissues become irritated by these germ-produced ferments, and if the ferments are sufficiently efficient, germ multiplication with a resulting increased ferment formation will take place and cause tissue destruction and necrosis. These germ produced ferments extend into the tissues

immediately surrounding a focus of infection, and not only repel leucocytes, but in all probability neutralize protective ferments which normally exist in the blood and are conveyed to the infected area. This would constitute what Wright designates as "an ec-phylactic sphere." Necessarily where the infection assumes extensive proportions, much of these germ-produced ferments are absorbed by the circulating blood and conveyed throughout the system and irritate the tissues of the body, causing various disturbances, such as fever, rapid pulse, headache, lassitude, pain, etc. In fact, since virulent rapidly progressing infections are the most toxic, and since coincident with this rapid extension of the infection, germ multiplication as a result of efficient ferment production resulting in effective germ nourishment and growth, with a correspondingly low germ-destroying power, it is evident that the major portion of the toxic symptoms in these rapidly progressing infections are due to the germ secreted ferments and not the result of endotoxins from disintegrated micro-organisms.

From the study of protein sensitization we have learned that when abnormal proteins gain entrance to the tissues of the body, specific ferments are produced which have a destructive influence on the abnormal protein, and that similar, if not identical, influences are aroused by tissue cells which are brought in contact with infecting organisms for the production of ferments which have a destructive influence on the germ for the establishment of an immunity. From the unquestioned rapid progress of infections during the time when these germ-secreted ferments are produced most rapidly, it is evident that they possess little if any influences which go toward stimulating cell activities toward producing protective germ-destroying ferments; but, on the contrary, everything seems to indicate that they retard, hinder or cripple tissue cells in their efforts to establish an immunity. The significance of this is more fully appreciated when it is realized that immunity from an infection is developed by the involved tissues in the infected area. If these toxic germ-produced ferments would actively stimulate tissue cells in the infected area for antibody formation, infective processes would be self-limited, because the time would inevitably be reached in every acute infection where the involved cells would be sufficiently

stimulated to produce the necessary amount of protective ferments to overcome the infection; but instead of such a favorable result, we often find tissue destruction with fatal terminations.

(*To be continued*)

THE DIAGNOSTIC AND THERAPEUTIC VALUE OF LUMBAR PUNCTURE IN LETHARGIC ENCEPHALITIS.*

By DR. GEO. H. HAUSER, New Orleans.

The present outbreak of Lethargic Encephalitis first appeared in Austria in the winter of 1916-17.[1] A few months later it appeared in Germany, and spread from there to Western Europe and Italy in the Spring and Summer of 1918. The first mention of cases in this country was by Bassoe,[2] who reported several cases seen by him in the winter months of 1918-19. Since that time numerous minor outbreaks and sporadic cases have been reported from all parts of Europe and America.

The review by Flexner[3] in the *Journal of the American Medical Association* of March 27, 1920, of the history, clinical features and pathology of the disease so completely covers the work that has been done to this time that more than passing mention here would be superfluous. His concluding remarks, however, that a wider knowledge of the occurrence of the disease and a better understanding of its nature, gained by studies undertaken from different angles, may lead to more thorough methods of diagnosis, treatment and prevention, has led me to report the findings in a study of the spinal fluids examined, hoping that such a contribution may be helpful in the differential diagnosis of this disease from other affections of the central nervous system.

Historical evidence tends to show that lethargic encephalitis is not a new disease. Outbreaks of a malady presenting similar clinical symptoms seem sufficient evidence of its existence in the 18th and 19th centuries, as shown by Netter[4] and others.[5] A strange coincidence has been its appearance in

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every instance either closely preceding or following outbreaks of virulent influenza. However, further study of the epidemiology and the probable causative agent of both encephalitis and influenza will be necessary to determine their relationship, especially in view of the work of Loewe and Straus,[6] and of Loewe, Hirshfield and Straus,[7] on the cultivation of a filterable virus from the spinal fluid, naso-pharynx, and brain tissue.

Spinal Fluid.—The spinal fluid in the cases studied were uniformly clear and usually under considerable pressure. The clear fluid puts aside at once the probability of a purulent meningitis, but does not exclude the possibility of a tubercular or syphilitic meningitis, or of toxic meningismus. In my opinion, the increase of spinal fluid and the symptoms attributed to it are most probably the result of toxic irritation and consequent hypersecretion of the fluid-forming cells, rather than an inflammatory exudate. In other words, a fluid such as is found in cases of true meningismus. There was no coagulun or film formed in the fluid on standing. This is contrary to what may usually be expected in tubercular meningitis.

The cell counts were normal or showed but a moderate pleocytosis. In none of the cases studied did it exceed 11 per cmm. The prevailing cell was the lymphocyte. The cell count is not at variance with that found in the blood stream. Streeker and Marsh have reported a case with a marked increase in cell count at times over 300 cells per cmm., and 55 to 60 per cent neutrophiles; however, since all authors are agreed that the lymphocyte is the predominating cell and the count rarely over 100 cells per cmm., it is highly probable that there was a super-imposed infection from some other cause.

Globulin was not increased in any of the cases. The globulin test is of special value in the differential diagnosis from tubercular, syphilitic and other forms of meningitis in determining the character of the cerebral irritation. In true meningitis the globulin is invarably increased, while it is not in meningismus.

All fluids gave a positive Fehling's Test. The Wassermann reaction was negative in all cases. The necessity of this test is apparent to dismiss the possibility of neuro-syphilis, but it

must be remembered that lethargic encephalitis may occur in one with syphilis.

The colloidal gold reaction was negative, the solution remaining unchanged in all tubes. This confirms the belief that the spinal fluid increase is the result of hyper-secretion and not exudative in character, as meningitis always produces a curve in the meningitis zone. Findley and Shisken[9] and Davis and Kraus[10] have noted a curve in the paretic zone in some cases, which showed also an increase of globulin, but this was not noted in the cases studied or confirmed by other authors. Smears and cultures from all cases were negative.

Therapeutic Value of Spinal Puncture.—In the cases studied it was noted that following spinal puncture and drainage of the canal, immediate beneficial results followed, irrespective of other therapeutic measures. The improvement in some cases was continued without further withdrawal of fluid. In two cases it was necessary to repeat the puncture and drainage to hasten the recovery. It was noted, however, that the patients in whom it was necessary to puncture more than once did not relapse to their former mental state, but remained stationary, which condition necessitated further drainage.

The amount of fluid removed varied in different cases, frequently as much as 40 to 50 cc. of fluid being removed at once. The results of draining such a large amount of fluid seems beneficial, and we should not hesitate to drain the canal until all pressure is removed. A good indication is to withdraw the needle when the fluid begins to flow drop by drop.

The spinal puncture should be performed with the patient reclining on his side, or, if the operation is performed with the patient in a sitting position, he should be reclined as soon as the needle is withdrawn. It is well to lower the head below the level of the body for a few minutes.

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DISCUSSION.

Dr. W. H. Seeman, New Orleans: I did not have the opportunity of seeing Dr. Hauser's paper before I heard it read. However, it was just as I expected. The Doctor has given you a very complete review of the literature up to date, and it shows, we know, practically nothing about encephalitis lethargica.

I have had opportunities to examine probably a dozen spinal fluids in suspected cases, many of which were clinically diagnosed as positive, and I can agree with Dr. Hauser that in every instance the cells we found were of the small lymphocyte type, and never exceeded, except in one case, forty cells. In other words, they never exceeded ten cells. In this one case I saw we did have a cell count of 40. I believe in one case there was a slight increase of globulin. In the other cases the reaction was practically negative. The colloidal gold test was run in every case I saw, because naturally in this condition we were very much interested and wanted to find out as much as we could about it, as well as the Wassermann test, using as much as 1 c. c. of the spinal fluid, and in each instance the test was negative.

A second remark made by Dr. Hauser is that in making a spinal puncture, if you find a clear fluid, it eliminates any possibility of an infectious meningitis. I do not think that statement is absolutely correct, because I can recall two cases, one especially, in a family which I saw in the country in which typical epidemic meningitis was present. There were two children, two brothers, very ill. I tapped the spine and gave them both serum, and the mother said her daughter was complaining; that she had just gone to bed for the first time. She had not been at any time in contact with the other cases. She only had a temperature of 99. She complained of headache. I tapped her spine and got absolutely clear fluid, under slight pressure. I advised that she be given some serum, as it would not do any harm, and the chances were she might be developing epidemic meningitis. The fluid gave a clear culture of the diplococcus of meningitis. We might find a clear fluid and not eliminate the possibility of an infectious condition.

There is a tremendous similarity between infantile paralysis or anterior poliomyelitis and encephalitis, both in the pathology and in the spinal fluid findings, and in the mode of transmission. I believe Dr. Park, of New York, is about ready to report certain results of private investigations which will tend to make the relationship even closer.

The main thing this paper suggests to us is the necessity of doing a spinal puncture when we are in doubt about any condition. I can remember when we first started at school the puncture of a vein was quite a tremendous procedure. I can recall, whenever it was given, five or six people were necessary to get into a vein. Today everybody is puncturing veins, and spinal puncture is going through the same phase. I hope it will not be abused, as I mentioned in the case of the puncture of the vein. I certainly believe there should be a great deal more spinal puncture done, and in that way we can get definite information.

With regard to the point Dr. Hauser brought out, of withdrawing fluid for therapeutic purposes, I have seen marvelous results following the withdrawal of fluid on a number of occasions, just simply and naturally due to the fact that pressure was relieved by reducing the amount of fluid. However, I have also seen cases in which that was not done improve likewise. It is simply mechanical relief temporarily, and I do not believe it is wise to persist in that too much, because you may abuse the tissues. You may produce shock that will be more detrimental than the shock produced by the pressure.

We had a discussion on the influence of the pressure, and I do not want to reopen that. In some cases I have seen wonderful relief afforded by the withdrawal of a little fluid. That should be carefully done. It should not be done too quickly or to a great extent. We can ordinarily in those cases where we have increased pressure and an increased amount of fluid take away 40 c. c. without trouble, but we should not be in too much of a hurry about it. We may tap, and if the fluid comes too fast the pressure should be gradually reduced. Every three or four seconds the drops will fall in normal cases. In some cases the pressure is so great that, as Dr. Crawford remarked yesterday in talking about a fracture case, he had to get out of the way in order to prevent being knocked down by the stream. I have never seen it quite that strong.

Dr. C. S. Holbrook, New Orleans: I agree with what Dr. Hauser said about the importance of the spinal fluid in the diagnosis of diseases of the brain. In lethargic encephalitis spinal fluid findings are of paramount importance. We have had a rather large experience of approximately 50 cases of this disease in the past two years. Often the diagnosis has rested upon the elimination of other conditions by examination of the spinal fluid, and we seldom make a diagnosis of lethargic encephalitis without the information that one can gain from a spinal fluid examination.

Our experience has been somewhat at variance with what Dr. Hauser reports, for positive findings in the spinal fluid have been present in a greater proportion of cases. The majority of our cases have shown an increase in cells from 10 and up to over 100 in a few cases. We had one case autopsied that showed 53 cells. Another case of typical lethargic encephalitis which came to autopsy did not show any increase in cells. Most of our cases have shown a slight increase in globulin, and this has been the most constant finding. In three cases coming to autopsy the globulin was increased in 2, and not increased in 1. The colloidal gold test has also been fairly constant in showing some degree of reduction. The Wassermann reaction in the cases were negative. One value of the spinal fluid examination is to rule out other conditions, a negative Wassermann and a low cell count will usually rule out syphilitic or tubercular meningitis.

Dr. G. H. Hauser, New Orleans (closing): I wish to thank Drs. Seemann and Holbrook for speaking of the condition of the spinal fluid in these cases. The experience of Dr. Holbrook is a little at variance with our own, and shows the necessity of further study of the spinal fluid from these cases. There has been some slight variation in the globulin, but to a smaller extent than the cell fluid, and much smaller in extent in the colloidal gold test. The principal point to be remembered is that in any case which is suggestive of this disease the spinal canal should be tapped as soon as possible and the fluid examined to rule out especially tubercular and syphilitic meningitis.

As to the remarks of Dr. Seemann of finding clear fluid in a case of cerebrospinal meningitis of the epidemic form, I would say that this is seen occasionally, and my remark was it would **probably** rule out this disease. It has been my experience in these cases that if the fluid is examined, even if it is clear, the polymorphonuclear cell count is usually increased.

I want to stress again the importance of making a lumbar puncture in all these cases where this disease is suspected, because the diagnosis in the final analysis depends on the ruling out of other diseases.

ECZEMATOID DERMATITIS DUE TO RINGWORM FUNGUS.*

By RALPH HOPKINS, M. D., New Orleans.

In 1908 Sabouraud demonstrated that the eczema marginatum of Hebra was due to a fungus growth which he named "epidermophyton inguinale." The eczema marginatum of Hebra has since more commonly been called "tinea cruris," or less properly "ringworm of the crural region." The epidermophyton inguinale was described by Sabouraud as being similar in some respect to the ordinary ringworm fungus, but differing in others both botanically and in its method of attack on the human skin, one point of difference being that the hairs were not invaded by the type of parasite infecting the crural region. Again in 1910 Sabouraud showed that the same epidermophyton inguinale was a very frequent cause of eczematoid conditions of the toes and feet. And since, the same fungus has been recognized as the causative factor in eczematoid patches in other locations on the body that present similar conditions of temperature and moisture.

The purpose of this paper is not to emphasize points in the diagnosis or treatment of ringworm of the crural region. Diagnosis is usually easy and treatment satisfactory. When, however, the epidermaphyton attacks unusual regions, the diagnosis is more difficult and failure to recognize the parasitic nature of the affection renders all treatment unavailing. Moreover, climatic conditions here are rather favorable to this special form of fungus growth which thrives best in regions warm and moist. In Ceylon, Castellani has observed that the Dhobie itch is often spontaneously cured on leaving the warm humid plains for the cool mountains, but that recurrence is likely on return to the plains. In Louisiana not many of us

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preserve dry skins in summer, and the same excessive perspiration that accounts for the relatively greater frequency of pompholyx on the hands and feet in this climate may also act as a predisposing cause for infection by the epidermophyton inguinale in regions that might escape in colder countries. In France, Sabouraud, out of a total of 26 cases of eczematoid affections of the toes observed during a period of a year and a half, found that 23 were caused by the epidermophyton inguinale and one by the ordinary ringworm parasite, and that only two were true eczemas not parasitic. Montgomery states that the incidence in California on the toes is not as great as recorded by Sabouraud in France, and attributes the difference to the cool climate of California. In our experience many eczematoid affections of the toes of long duration have yielded to anti-parasitic measures, and a great many cases that ten years ago would have been classed as intertrigo, or eczema, or pompholyx, or to maceration due to excessive sweating of the feet, are now regarded as being of parasitic origin.

The regions, then, which are most under suspicion of epidermophyton infection are: the crural (left more particularly), axillary, cutaneous folds, such as that under the breasts of women, and last, but not of least importance, the interdigital spaces of the feet. Moisture seems an essential factor. More rarely the epidermophyton inguinale is found responsible for eczema, like dermatitis on the hands and even in other locations.

When the occurrence is on the feet or hands the appearance characteristic of epidermophytosis of the crural region is lost, and eczema or intertrigo may be so closely simulated that the proper diagnosis may be missed.

The interdigital folds between the toes seem to be the starting point on the feet in the majority of instances, though there may be, in rarer cases, a spread from these points over the dorsal and plantar surfaces even to the heel. The horny layer of the epidermis appears macerated or may be exfoliated, leaving a bright red surface; or, again, there may be a distinctly cheesy appearance. As the patch spreads, vesicles often form in the advancing border and become postular or rupture, with consequent exfoliation. The eruption is most

active between the toes and the line of advance over the fore part of the foot is quite distinctly marginated and wavy. On the plantar aspect the affected part may be rough and corneous. The interdigital and flexion folds between the fourth and fifth toes are most often involved, and the infection may be unilateral.

Epidermophytosis of the toes is marked by its chronicity, there being but little chance of spontaneous recovery or of cure by any means which is not directed at destruction of the fungus. A case at present under treatment has a history of twenty years' duration. In this patient there is a clear history of infection of the toes from a crural tinea contracted in a gymnasium among whose attendants there was at the time an epidemic of ringworm of the crural region. In evidence of the efficacy of anti-parasitic treatment it may be mentioned that this case has almost entirely cleared up under treatment with salicylic and benzoic acid, in spite of the twenty years' duration.

Treatment advised by Sabouraud is the use of chrysarobin. The main reliance is placed on this drug in one per cent salve or stronger. More recently a combination of salicylic and benzoic acid in vaseline has been advocated. The latter treatment has been popularized in this country and is found to give excellent results.

In conclusion I would like to make the suggestion that the suspicion be entertained that a vegetable fungus may be the cause of eczema-like affections in other parts of the body than the crural region; that this suspicion be doubly strong when the interdigital folds of the toes are the parts affected; that in these cases the crural region be examined for tinea cruris or a history of tinea cruris; that microscopic search be made for the epidermophyton inguinale, and finally that salicylic acid and benzoic acid in vaseline be tried as a therapeutic measure. The astonishingly good results obtained will be found in the great majority of cases to warrant this procedure.

DISCUSSION.

Dr. H. E. Ménage, New Orleans: The subject taken up by Dr. Hopkins, I believe, should be of interest to the general practitioner. I have a degree of compassion for the general practitioner

who tries the difficult task of making a diagnosis of skin diseases, but if he accepts a lesson and takes a gambling chance that whenever a male or a female comes to him with a skin disease of the feet or hands not try to label the disease, but examine the individual for the Epidermophyton Inguinale infection (Dobhie Itch, Eczema Marginatum of old text books) on the inner sides of the thighs, perineum, and buttocks, and if present, consider the hand and feet disease of that nature, he will correctly and successfully treat the case in probably no less than 75% of his attempts.

The Epidermophyton has been held responsible for such a variety of skin manifestations about the hands and feet (Ground Itch, Pompholyx, Eczemas, and even Hyperkeratoses) that the miscroscope naturally is the deciding factor. Dr. Hopkins has tried to make the diagnosis easy and practical for the general practitioner by establishing the nature of the diseases of the hands and feet by the presence of the groin infection. I will go a step further by saying that even in the absence of the groin infection I resort to the specific anti-parasitic treatment of diseases of the hands and feet and obtain far better results than in the past.

Salicylic Acid and Benzoic combination is the so-called preparatory treatment. The Whitfield formula is two grams of Salicylic Acid, four grams of Benzoic Acid and thirty grams of some vehicle. The skin is prepared thoroughly for five days, the ointment being well rubbed in. Sometimes these patients complain bitterly of a burning sensation. I have applied this particular ointment on the vulvae of women and on the scrotum of men without complaint, but when they do, the application of a little ice water relieves them at once. The reaction is almost always subjective and hardly ever objective, such as redness, blistering and the like. Many cases will appear well and apparently cured from this first treatment, but will relapse after a short time if the treatment is not kept up or if not followed by the use of Chrysarobin in five or ten per cent strength. Formerly we were very much concerned on account of the great amount of reaction from it, but now I do not hesitate to rub in a ten per cent ointment when I think it necessary.

I always warn the patient about the reaction, so that he will not worry. The reaction is not as a rule painful. The moment the reaction is noticed, the treatment should be stopped and bland applications made.

Dr. J. N. Roussel, New Orleans: Before we use the Whitfield ointment on all of our patients indiscriminately, we should use it on ourselves once or twice, and then I am sure we would not use it on some of them. I prefer Chrysarobin. I use two, never over four per cent every three days, and that usually does the work.

I want to say a word as to what I believe to be the mode of transmission of the Epidermophyton. I am firmly convinced that the organism is transmitted in new clothes—new underwear. I think probably the organisms come directly from the cotton fields. It is not, therefore, necessary that the primary lesion be in the groin. It may be on any part of the body. I have seen it primarily on the feet, axillae and various other places.

A PLEA FOR MORE CAREFUL EXAMINATION AS A MEANS LEADING TO A MORE ACCURATE DIAGNOSIS.*

By J. E. KNIGHTON, M. D., Shreveport.

In discussing this subject I do not propose to tell you something that you do not know already, but it has occurred to me that it may not be without profit to us all to ask ourselves the question: Are we in all cases giving our patients the careful, painstaking, conscientious examinations that they are entitled to receive at our hands, and that we, as scientific medical men, should feel obligated to give?

Far too frequently do we see patients who have passed through the hands of several physicians each of whom has made a different diagnosis and not one of whom has really made a thorough examination. The effect of such an experience on the patient's mind is obvious, and we need not be surprised to learn that his confidence in the profession has been shattered and to see him seeking relief at the hands of irregular practitioners or becoming a victim of the patent medicine evil.

A mistake that is frequently made is regarding certain symptoms as a result of some previous illness that has no relation whatever to the present condition. Perhaps malaria and syphilis are the two diseases that are most sinned against, in that they are held responsible for many symptoms for which they are in no way responsible. It is also very convenient since the epidemic of the past two years to tell the patient that his symptoms are due to the after effects of influenza. This probably satisfies the patient and costs the doctor very little effort.

To cite an example illustrating the above statements, I will mention a case that came under my observation a few months ago: Patient complained of diarrhea which had given trouble for several months. He gave history of having syphilis twelve years previously, for which vigorous and repeated treatments had been given. His disorder was charged up to syphilis, and more anti-syphilitic treatment given, notwithstanding the

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fact that repeated negative Wassermann tests were made. A proper examination, including the use of the X-ray and other laboratory tests, gave a diagnosis of partial stricture of the colon, due to tuberculosis, which was corroborated by laparotomy. In addition to involvement of the colon, there were small tubercules scattered throughout the peritoneal cavity, and enlargement of mesenteric glands, specimens of which were examined by pathologist and reported to be tubercular.

It may be said that in cases such as the above, there may be some excuse for error; but the most inexcusable error, and one that is most fatal to the patient's chances of recovery, is the diagnosis of pulmonary tubercular cases as chronic malaria and treating them as such over long periods, and until the disease has become so far advanced that recovery cannot be hoped for. Several such cases have come under my observation during the past few years.

There is but one way to avoid errors in diagnosis, and that is by adopting a systematic routine method of procedure and following this line in the examination of every patient. If this is followed out faithfully in every case, it soon becomes natural to begin every examination in the same way and the different steps follow in the order that you have trained yourself to approach them, and nothing will be overlooked. It matters not what type of stethoscope you use, nor what method of percussion you adopt, if you will continue to use the same instrument and the same method until they become your own. It is in this way only that dependable conclusion can be reached.

The routine formula to be followed in the examination of every patient should consist of the following:

I. *A Careful and Intelligent History.*—This should include family history, personal history of previous illnesses, and history of present illness. In securing this history, an effort should be made to properly interpret the symptoms of present complaint, and also to properly relate them to previous illnesses.

II. *Physical Examination.*—This should begin as the patient walks into your examination room, noting the facial expression, gait, manner of greeting, and physical bearing in gen-

eral. We then proceed with investigation of the skin, the eyes, the nose, the throat, mouth and teeth, the glandular system, and the reflexes.

We would next examine the chest, and it is here that the real science of physical diagnosis has its greatest opportunity. The general outlines of the chest should be taken into consideration. We may be dealing with an asymmetrical chest, which suggests rickets in early life, or a chest of the long type with its narrow subxiphoid angle and with all its predisposing tendencies to visceraptosis. The condition of the heart, lungs and pleura should be determined by inspection, palpation, percussion and auscultation. Every abdomen should be studied as an individual problem. Is the abdomen distended, flat or retracted? Is muscular rigidity, localized or general, present? Is hepatic or splenic enlargement demonstrable by percussion or palpation? Are the kidneys palpable? Is pain or soreness elicited by touch or pressure? If so, is the pain located at point of pressure, or is it referred to some distant point? Are tumors or inflammatory masses palpable? Are they fixed in position, or are they movable? All of these and yet others are pertinent questions regarding the examination of the abdomen. Pelvic and proctologic examinations, of course, should be made when indicated.

III. *Routine Laboratory Examinations.*—They should usually consist of at least chemical and microscopic examination of the urine, and red and white and differential blood counts.

IV. *Special Laboratory Examinations.*—These are to be such as the nature of the case may require, such as examinations of sputum, stomach contents, feces, exudates, Wassermann, and the various X-ray examinations. Much valuable information is lost by the careless disposal of specimens which have not been properly examined and studied. The following will illustrate the importance of making proper examinations of all specimens: A patient who had typhoid fever fourteen years ago, and had had repeated attacks of gall-bladder trouble since that time, gave a pure culture of typhoid bacilli from bile withdrawn by means of the duodenal tube.

On examination of specimen from another case of cholecystitis secured by duodenal drainage, the smear was simply

swarming with lambia intestinalis. This patient had lived in Louisiana all her life.

In closing this paper I want to appeal to the physicians in the rural communities, the villages and the smaller towns, as well as in the larger centers, to co-operate with each other in order that we may do a class of work commensurate with the dignity and greatness of our noble profession.

DISCUSSION.

Dr. A. A. Herold, Shreveport: I think we all agree heartily with Dr. Knighton in his statement that a great many diagnoses are made through error or from haphazard examinations and carelessness.

There is one class of cases which he did not call attention to, and which I wish to mention. I refer to the neurological cases. In such cases the diagnosis is not infrequently overlooked. Only yesterday a patient came under my observation who had made the rounds of different physicians and had received various diagnoses. One diagnosis was that the patient had a vesical valculus. Another one treated him for hyperacidity of the stomach; another one decided that he had a spinal tumor, whereas as a matter of fact he had an advanced case of tabes dorsalis and showed that the crises had been overlooked. We cannot be too careful in laying stress on getting a history and making an examination from a neurological standpoint.

Dr. H. P. Jones, New Orleans: I believe the great trouble with the average physician is that he feels specialists have some God-given power, some keenness of insight which the average physician does not have. But, as Dr. Knighton has brought out, the trouble is that most errors are the result of either laziness or carelessness on the part of the practitioner. There is not a man in this room who could not find out in 95 per cent of the cases what is the matter with the patient if he would take the trouble to do so. It is not necessary always to have all of the laboratory equipment that is found in well-equipped hospitals. It is unnecessary to make a chemical examination of the blood to find out the extent and nature of kidney trouble, and it is a very great mistake for physicians to feel that they cannot do everything they read or hear about. If they will make a systematic and personal examination of the case, in the great majority of cases they will make a diagnosis just as correctly as one that can be made by the most elaborate laboratory paraphernalia and apparatus.

Dr. W. J. Durel, New Orleans: I did not hear all of the Doctor's paper. One diagnostic aid with me is tuberculin. The Doctor mentioned everything, even the Wassermann, but he overlooked referring to the use of tuberculin. If any disease is prevalent it is generally considered tuberculosis, and if any disease is not always diagnosed there may be a suspicion that it is tuberculosis. I am glad to see that modern literature has recognized the fact that tuberculin will clear up doubtful cases. The cutaneous test denotes infection, and the subcutaneous test denotes activity.

Dr. T. E. Wright, Monroe: This strong appeal for a more careful and painstaking diagnosis most certainly should result in much good. We have entirely too many men scattered over the country,

and doubtless a substantial percentage of city men, who rely entirely too much upon intuition for diagnosis. The expression, "I have a hunch it's typhoid fever," doesn't mean much unless backed up with clinical findings, history, and the laboratory. The type of man who makes snapshot diagnoses also writes shotgun prescriptions. It is not by any means too laborious for a general practitioner to establish some sort of a general routine, modifying, readjusting and improving this routine from time to time, to the end that he gives to the patient at least part of that to which he is entitled. Unfortunately, many men are growing careless, as they get older, in the use of their stethoscopes. I shall never forget a little party held in this room by the graduating class of 1909; thrown on a screen were the final goodbye injunctions of the different professors. Among the many good ones was one by Dr. Halsey: "For God's sake, don't forget your stethoscopes."

Dr. George S. Bel, New Orleans: I did not expect to be called upon to take part in this discussion. I realize that Dr. Knighton has put before us a very elaborate subject, and it is a physical impossibility for any individual to cover that subject in toto, and we all feel that his paper will stimulate us to take more careful and painstaking histories of our cases, as well as to be more thorough in our physical examinations. We know that a superficial examination is detrimental to one's reputation.

Dr. A. L. Levin, New Orleans: I want to stress one important point. We should not be carried away too far by a history of influenza. In my experience since the last epidemic, influenza plays a very important part in gastro-intestinal disturbance. I have seen more gastro-intestinal cases following the last epidemic than in the years previous. The explanation for it is probably, as Dr. Lyons mentioned in his report, that the swallowing of infected sputum causes duodenitis. He has seen a number of cases where infection of the biliary tract followed the same infection.

There is probably another explanation for it. We know that the organism or toxemia causes a tremendous shock to the nervous system, the weakening of the nervous system causes a change in some way in the gastro-intestinal secretions.

Another point of interest which Dr. Herold has mentioned is the importance of not overlooking a gastric crises of tabes. I have laid stress on that subject in a paper of mine several years ago; we infrequently overlook the early stage of tabes. We are called in to see a case of vomiting, and we take it for granted that we are dealing with an acute indigestion. The physician should not fail to examine the knee reflexes and the pupils. Cases of that type have a loss of knee reflexes, one pupil larger than the other, or the typical Argyll-Robertson pupil. Such evidence should put the physician on the alert and he should suspect gastric crisis of tabes.

Dr. A. C. King, New Orleans: Yesterday, in discussing gall-bladder conditions, one of the gentlemen present called attention to the fact that the teeth had a good deal to do with gall-bladder trouble, and he had traced two or three cases to the mouth. That recalls to my mind the importance of the prostate gland in obscure cases. Here is a case in point: A patient had been ill for quite a long time and made the rounds of various physicians. He had his teeth examined, and those that were diseased were taken out and plates put in. In short, he had several things done. At the time he came to me I examined his gall-bladder and he imagined he had cholecystitis, or stones. He would not consent to have an operation performed, and finally fell into the hands of a man who could make a REAL diagnosis; this man examined his prostate

gland, and, in doing so, the patient nearly jumped off the table. He then sent him to a genito-urinary specialist, who massaged his prostate repeatedly, and in a few weeks this man gained twenty pounds in weight and was in perfect health. This case taught me a lesson as to how much trouble the prostate gland could give in a particular case. The patient got well; he is a professional man, and a good many of you know him. The lesson I learned from this case was that it is always wise to examine a patient from head to foot. If you suspect gall-bladder trouble, examine the teeth. You should examine the gall-bladder, the prostate gland, and so on down the line.

Dr. J. E. Knighton, Shreveport (closing): It was not the intention of the paper to cover every phase of an examination, from the simple fact it was practically impossible to do that in the space of fifteen minutes. Furthermore, it is not necessary. The object of the paper was to call attention to the fact that so many of us are making careless examinations.

BRONCHIECTASIS.*

By DR. GEO. S. BEL, New Orleans, La.

In my long clinical experience I have been led to believe that much written on this condition does not coincide with the true morbid anatomy. We all have the idea firmly embedded that bronchiectasis is a very common condition occurring in a great variety of pathological states, and is a true dilatation of the wall of one or more bronchial tubes. The term "bronchiectasis," which literally means a dilatation of a bronchus or bronchi, as understood by the clinician, is, in my opinion, too loosely employed. I have been impressed at the post-mortem table with the infrequency of dilated bronchi where there is no thickening of the wall and the opposite condition, namely, a narrowing of the bronchial tubes where these walls were thickened. Undoubtedly, a number of pathological conditions of the bronchial tubes are included under this term. For example, the tube that is thickened and, in consequence, narrowed as a result of this thickening, gives rise to the symptom complex that we have for true bronchiectasis. Like many other terms such as Hodgkin's disease, Addison's disease, cirrhosis, etc., cover a greater field than the literal meaning permits. Addison's and Hodgkin's diseases were intended to express distinct entities of the adrenals and lymph glands respectively; we know that a variety of conditions of these

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glands give rise to the pictures described by Addison and Hodgkin, though the original term is still adhered to. In other words, these terms used to describe a specific clinical condition are now employed in a composite sense; so it is with the clinical entity "bronchiectasis." The morbid anatomist commonly meets with a condition of the bronchial tubes that does not conform in the strict sense to the term "bronchiectasis," where the history of the case speaks conclusively of a bronchiectasis.

The impression extant is that bronchiectasis is a condition in which the tubes are enormously dilated, the tissues composing the wall remaining intact, which might be likened to the "ballooning" out of a rubber tube by pressure from within. These dilatations are described as fusiform or cylindrical and saccular. The fusiform type is one in which there is considerable length of the tube involved, while the saccular is the reverse. In the latter, the dilatations are described as ranging from the size of a bean to that of a walnut.

It is claimed by the clinician and Roentgenologist that bronchiectasis can be detected even in its early stage. Now, while I do not question that the Roentgenologist can detect it where the tubes are thickened, I, as a clinician, must admit I know of no physical signs that are diagnostic of bronchiectasis of the ordinary type referred to in our standard texts. A patient may, over a long period of time, manifest many of the signs and symptoms which lead to a diagnosis of bronchial tube dilatation, and, from the study of the morbid anatomy, reveal that the tubes are not dilated, but greatly thickened and narrowed. In other words, the pathology is that of chronic bronchitis.

The mistake made is the result of too little attention to the study of the microscopic morbid anatomy. Not only is this true of this condition, but for many others. If I may be permitted to sound a note of warning, I will state that the general practitioner does not devote sufficient time to the study of pathological conditions under his observation, which, after all, is the only confirmatory evidence. If the clinician would follow these cases to autopsy and make a careful study of both the gross and microscopic findings, much existing confusion

and diversity of opinion would be clarified. Of course, where you have the sacculated bronchiectasis the size of walnuts, they are readily detected, but these I regard as true cavities. I realize that all cavities, no matter how small, communicate with bronchi; therefore, in this sense, we are dealing with bronchiectasis.

The so-called bronchiectasis always means disease of the bronchial tubes; this disease may have begun in the tube or may have started outside and extended into the bronchial tubes. In both instances it occasions a bronchitis. Therefore, we might say that all bronchiectasis has as its forerunner a bronchitis.

Whether the disease of the tube is an acute or chronic inflammation, there is bound to result primarily more or less narrowing of the bronchial tubes. In the case of an acute inflammation, this narrowing is produced by a swelling of the inner lining, due to inflammatory exudate. Coincidentally with the narrowing, the tube wall is, in consequence, thickened. This thickening of the bronchial tube walls creates an optical illusion when viewed at the autopsy table, for the reason that such tubes stand out prominently and are in marked contrast to the adjacent normal bronchial tubes of the same caliber.

On the other hand, if the inflammation is a chronic one, and is secondary through extension into the bronchial tubes from the peri-tubular tissues, a narrowing of the lumen with a thickening of the wall occurs.

The above two conditions give rise to the so-called fusiform or cylindrical bronchiectasis, and is seen in various lobular pneumonias and especially in tuberculosis. In this connection, I want to say that such a bronchiectasis is not a dilatation, but a thickening of the bronchial tubes, and as a matter of fact the lumen is of smaller diameter than that of the normal tube.

Where the diseased tubes are chronically inflamed, the newly formed tissue in and about the tubes undergoes degeneration to such an extent that the tube-wall is destroyed. This is particularly true in tuberculosis. Following such a degeneration there is liquefaction and loss through digestive action. The degenerated tissue which has formed a pseudo tube wall

falls away and escapes in the form of expectoration through the tube that leads into the area, and this now occasions a marked increase in the diameter of the tube at this point. The extent of the increase in calibration is dependent upon the extent of the liquefaction of the degenerated newly formed tissues. As a result we now have what seems to be a greatly dilated tube, but in reality such is not the case, since there is no tube wall present. Such a condition probably explains the walnut-sized saccular bronchiectasis referred to in standard texts. I regard such a hole as a CAVITY, which, of course, communicates with a bronchus.

As already stated, bronchiectasis is invariably associated with disease. As a rule, the disease extends into the lung tissue proper and in the form of a lobular pneumonia. When the bronchiectasis is preceded by a disease of the bronchial tubes, there is certain to follow a peribronchial inflammation which gives us more or less consolidation of the adjacent lung parenchyma. This consolidation of the peribronchial tissues always forms a part of the bronchiectatic wall. Microscopically, the examination of the wall of the so-called saccular bronchiectasis reveals no bronchial tube tissue, but peribronchial and lung tissue proper. There is no epithelium lining the inside of such a sacculation, although to the naked eye the inner coat appears smooth, as though it were a continuation of the mucosa of the bronchus. I would say the rule is to find the inner side of the so-called bronchiectasis rough and granular, which is in itself gross evidence of a loss of the normal tissues of a bronchial wall.

At autopsy the ordinary fusiform bronchiectasis of the clinician is often seen as a tube or tubes which are greatly thickened (chronic bronchitis) and their lumens usually narrowed, the thickened tubes being uniform rather than sacculated. The narrowing of the lumen is naturally to be expected, since the thickening is the result of reparatory connective tissue, new growth, which contracts in keeping with all scar tissue.

Do we frequently see bronchiectasis in empyema or asthma? In these two pathological conditions the cause is mechanical interference with the intake and output of air, causing an extreme dilatation of the air sacs, sometimes to such an extent as to produce rupture, but no dilatation of the bronchi. Cer-

tainly, if pressure from within the tubes were to be regarded as a cause for permanent dilatation, we would expect to find it most marked in these two conditions.

In bronchiectasis there is always a diseased bronchial tube, and on the extent of the disease will depend whether the pseudo-dilatation is saccular or fusiform. In all bronchiectasis there is a disease of the bronchial tubes, with loss of substance; the apparent dilatation is the result of loss of substance. In tuberculosis is seen more frequently the so-called bronchiectasis, which in reality is early CAVITY FORMATION. It is well known that all cavities in tuberculosis communicate with a bronchus, and were this not the fact we would never have a cavity. All lobular pneumonias, no matter what the etiology, begin as inflammation of the bronchi, and from here extend to the lung tissue, and these inflammations subsequently lead to more or less thickening of the bronchi, and can in some sense be regarded as bronchiectasis. It is not possible, however, to detect clinically that you have a separate morbid condition of the tubes.

I believe that many so-called bronchial sacculations are in reality destroyed lung areas, such as abscess, gangrene, or true cavities. I further believe that many tuberculous cavities are mistaken for sacculated bronchiectasis.

The symptoms of bronchiectasis differ very much in different cases, and are frequently those of the associated disease, and in some cases may be entirely absent. As a rule, one of the earliest symptoms is cough with expectoration; at first the cough may not be severe and expectoration slight, but as the disease advances the cough increases with the amount of sputum, until at last very large quantities—a pint or more—may be expectorated in twenty-four hours. The manner of coughing is often characteristic; the patient will not expectorate for some hours, and then, perhaps after some movement which disturbs the contents of the tubes, he will begin to cough and, with more or less violent paroxysms, will bring up several ounces.

Physical signs, like the symptoms, vary in different cases, and no special sign can be said to be pathognomonic of the disease, and the previously described pathological conditions

which may be associated with bronchiectasis readily explain the reasons; therefore, I will not attempt to give a detailed description.

The X-ray, according to Alexander B. Moore, of Rochester, Minn., usually differentiates bronchiectasis without difficulty from abscess of the lung by its location and the fact that the walls of its cavity are relatively thin and small. These cavities are multiple and there is absence of a fluid level within them.

It is universally stated that bronchiectasis may be differentiated from abscess of the lung by the fact that in abscess the sputum shows elastic fibres and has a foul odor. Also in abscess there is evidence of general infection and signs of local cavity formation. In my opinion, I cannot see how the presence of elastic fibres in the material expectorated has any differential value, since these may be found as frequently in one condition as in another. Any morbid change in the lungs associated with degeneration may of necessity yield elastic fibres in the sputum. In abscess, gangrene and cavity formation there is more or less degeneration of tissues; therefore, elastic fibres are to be expectd in the sputum.

With regard to the foul odor as a differential point, this may also be noticed in any material expectorated. Obnoxious odors are always indicative of putrefaction, which can only be produced by saprophytic, proteolysing micro-organisms acting upon dead organic matter. Since we have in the lungs such organisms because of the direct relation of the lungs to the outside world, putrefaction is more likely than in any other part of the body. The intensity of the odor depends upon the degree of putrefaction, and the degree of putrefaction depends upon the amount of degeneration.

With regard to the sign of general infection as differential for abscess of the lung, there may be something in this sign; however, the general infection is not always present in lung abscess.

In conclusion, let me state that I recognize fusiform or cylindrical bronchiectasis, which is common in pulmonary tuberculosis.

The so-called sacculated form of bronchiectasis, I believe, is nothing more than true cavity formation, and in no sense a purely dilated bronchial tube; and, furthermore, if they do exist as a dilated tube, there must be very few cases, as we never find them at the postmortem in the Charity Hospital of New Orleans.

DISCUSSION.

Dr. J. B. Guthrie, New Orleans: The picture of bronchiectasis is a very definite one, from a clinical standpoint. Naturally we have to exclude cavities of tubercular origin and in considering the subject we want to think of the word "bronchiectasis" as meaning a dilatation.

In the chronic cases we should bear in mind bronchial thickening, the retention of air inspired, and a forcible expiratory effort will dilate the tube behind. The thickening of the tube is there in all these chronic cases of bronchitis, and we have an occlusion existing, a partial retention, an effort to bring about expulsion of the air, and the tube must dilate. That is the story of every single tube we have. There is a narrowing of the lumen, and the effort to penetrate that lumen brings about a dilatation. Clinically, we are in the habit of considering bronchiectasis when we have a lesion at the base associated with a large amount of sputum, and when it is emptied out periodically it must come from a cavity somewhere. It is perfectly impossible to think of as much as a pint of sputum coming from the system of capillary tube or tubes approaching the capillaries in point of size, the patient being able to live through that period and accumulating sufficient fluid to empty itself again perceptibly. These cases are usually associated with some changes. Stress is laid on the thickening of the finger tips, and clubbing of the fingers in the older cases. We have overlooked some of these cases in the hospital.

Two months ago I had a conversation over the autopsy table with Dr. Duval regarding the statistics in other hospitals, and why it was that we as clinicians were seeing these cases of true bronchiectasis in such few numbers as compared with clinicians elsewhere. He gave me the explanation that we have here a thickening of the bronchial tube, and he maintained, as Dr. Bel maintained, that we have no dilatation, but a narrowing of the lumen. It seems to me a narrowing of the lumen means that somewhere in the course of that bronchus there is dilatation. I cannot get away from the notion that there must be a place for the large amount of sputum which we see poured out intermittently. These cases require diagnosis. If they are not diagnosed, and if we do not get them and resort to surgical drainage, there is absolutely no hope for them. They will never get well. We have got to empty the sputum. Sometimes we resort to one means and another to get rid of the sputum. But those cavities require emptying. The Trendelenburg position sometimes is necessary in these cases, and various types of medication may have to be resorted to which will liquify the secretions. Such medication will help very materially.

Dr. J. W. Durel, New Orleans: This is a very interesting and timely paper. Dr. Bel said that the Charity Hospital autopsies did not show bronchiectasis, but in the tubercular ward of the hos-

pital in the last eight years we have had 28 cases referred to us as tuberculosis which were cases of bronchiectasis.

I agree with Dr. Bel that bronchiectasis is not necessarily associated with a peculiar dilatation of the bronchus. As has been shown by Hammond, Brown, and Baldwin, there may be a true bronchiectasis and yet you do not detect dilatation of the bronchi after death, because these cases of pure bronchiectasis occur for the reason stated—that in bronchiectasis there is always a thickening of the bronchial mucous membrane and tissues. You must remember that during inspiration you have negative pressure in the lung. With expiration there is positive pressure in the lung. These are constricted bronchi. You have a very positive pressure practically always existing in the lung. A bronchiectatic case that constantly coughs has a strong positive air pressure in the lung.

I would like to see brought out his diagnosis of the fact that this condition is being recognized in the clinic. When you stop to think that reports from institutions all over the world show that from ten to fifteen per cent of tuberculosis institutions have admitted patients as cases of tuberculosis that were simply cases of bronchiectasis, it behooves us to be more careful in our diagnosis.

One point I have always made and help my class to watch for, is: that a profuse expectoration is constantly negative with lesions at the base, and I do not classify it as tuberculosis until I have satisfied myself of the presence of a tuberculosis infection, not only at the point of invasion, but in other parts of the lung by the presence of tubercle bacilli in the sputum. Not until you get tubercle bacilli in the sputum are you justified in classifying a bronchiectatic cavity as tuberculous.

I was present at a meeting of the National Tuberculosis Association in which the subject was discussed of the differentiation between bronchiectasis and tuberculous cavities.

Dr. Elliott, of Toronto, laid special emphasis upon club fingers. This was about five or six years ago. I did not pay much attention to it at that time, but on further observation I have been surprised to see the number of bronchiectatic cases showing club fingers. I agree with Dr. Bel that bronchiectasis is nothing but a cavity. There may be the presence of a cavity in an individual at the base. The presence of a cavity in the lung of an individual who showed no symptoms of toxemia, who is well fed, who has not lost weight, who has shown profuse expectoration negative, you are safe in making a diagnosis of bronchiectasis.

Dr. A. Henriques, New Orleans: I have listened with a great deal of interest to this very scientific paper of Dr. Bel, and I think, so far as I can gather from his statement, that in bronchiectasis we are dealing not with the dilatation of a bronchial tube, but with a degenerative ball of the bronchus and with a true cavity. I do not believe that we can contradict the teaching of pathology in this connection. We can with the Roentgen ray recognize special thickness of the bronchial tubes, and we can recognize cavities which are frequently overlooked, especially if the cavities are not large, and if they are situated several inches from the surface. The work of Moore, of the Mayo Clinic, the work of Weitzner, of the Mount Sinai Hospital, New York, has furnished us considerable information with regard to the detection of these cavities, and I do not think we should look for clubbing of fingers as a means of diagnosis of a cavity in the lung, nor do I think we should depend upon indirect signs when we can with a careful physical examination supplemented by the X-ray recognize a cavity where it exists.

Dr. George S. Bel, New Orleans (closing): I will answer Dr. Durel first. His explanation and his idea of bronchiectasis are thoroughly in accord with what I said. There seems to me a misinterpretation about the pathological description. It evidently has not been absorbed by some one. Dr. Durel's idea is correct, and I thoroughly agree with what he has said and did not deviate from that view.

Dr. Henriques' idea is absolutely, pathologically and scientifically correct; but how my friend, Dr. Guthrie, can advocate surgical procedures to remove a large quantity of pus and keep in contact with the bronchial tube is beyond all scientific comprehension. I know that nitrogen gas is introduced to compress the tube, but in the name of pathology and morbid anatomy, how can you conceive of a man having a pint of blood coming out through a hole in his chest when there will be more pus in his tube or somewhere else? It must be some job to get it out. I have had at least a dozen anatomists tell me that for the wall of a bronchus to remain intact when there is all that pathology present, is impossible. It is never heard of, and has never been seen.

I want to illustrate as clearly as I can by drawings on the blackboard what I mean. Here (indicating) is a bronchial tube which is microscopical. We have here (indicating) a sacculated dilatation. If we have an acute bronchitis to deal with, we have an inflammation. We cannot have inflammation without exudation in the lung. We are bound to have narrowing. You talk about a man spitting up a pint of pus and of having a surgeon go in and evacuate that pus. That must be some hole. (Laughter.) I said it was a cavity, and in my paper I pointed out that this tube in here (indicating) was eroded or degenerated. All these inflammatory processes to undergo degeneration, and this degeneration had to be watched to be eliminated. Where does it come from? It is too absolutely absurd to talk about.

What becomes of all that material? After fermentation takes place it becomes liquified and is expectorated. And it is some hole. That is a lobular pneumonia and bronchitis. In a case of tuberculosis you do not have lobular pneumonia. It is impossible to have physical signs without a lobular pneumonia. You talk about peribronchial thickening. You cannot have a hole the size of a walnut, as laid down in the text-books, with bronchial breathing, with pectoriloquy. You cannot get a tympanitic note without a large quantity of air being present. Here is your bronchial tube (indicating) whether you have air sacs or not. When it balloons out, what becomes of the air sacs. They must be pressed open and all nutrition is taken out. You have lobular pneumonia and all the pathology follows.

I cannot agree with my colleague, Dr. Guthrie, in what he has said, but I do agree with Dr. Durel. He did not find dilated bronchi in the postmortem room. I said the bronchus is gone, but the cavity is there. They are not bronchiectatic cavities. There is no more wall to the cavity. The wall is gone, and was expectorated perhaps six months ago. Dr. Guthrie is talking about a sacculated dilatation which anatomically, pathologically and histologically does not exist.

MUNICIPAL REFUSE COLLECTION AND DISPOSAL.*

By DR. H. R. CROHURST, Washington, D. C.

The collection and proper disposal of the materials discarded as waste by the members of a community is a problem that the municipal officials are called upon, sooner or later, to solve satisfactorily. With the increase in density of population from year to year and the growth of suburban districts into urban communities, a closer study, greater thought and more earnest consideration are demanded to work out the proper solution of this essentially municipal problem.

The question of proper refuse collection and disposal is one closely allied to the health of the community. Aside from the nuisance arising from unpleasant and objectionable odors given off from decaying organic matter when stored at the point of production awaiting collection, or at the point of ultimate disposal, there are to be considered the questions of the production of flies in the vicinity of habitation, with liability of increase in fly-borne diseases and the supply of food for the rodent population in areas where the spread of plague is an important consideration

Local conditions existing in different communities are so varied that the collection and disposal of municipal refuse must be taken up and studied separately for each locality by itself. The application of data secured from municipalities where systems of collection and disposal are in operation are not always satisfactory. Data from municipal reports are sometimes misleading, costs are not figured on the same basis, and it is rarely stated what items are included in arriving at cost figures. In the studies of collection and disposal of municipal wastes, conditions to be met vary with the type of habitation, class of population, character of industries, climate, geographical location, topography, condition of streets and alleys, and such variation must be taken into account when applying data derived from other communities.

The cost of operating the waste disposal system is of the greatest practical consideration, but the effort to reduce the

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cost should not be carried so far as to sacrifice sanitary methods. The proper method of collection and disposal of wastes for a given community cannot be determined by any fixed rule. The object to be obtained is an efficient method of collection and disposal in a sanitary manner and at a reasonble cost for all classes of wastes. It can be definitely stated, however, that no method of utilizing municipal waste has as yet been developed that will cover both the cost of collection and disposal. Certain methods may be made to meet some of the expenses of disposal, but in every instance the combined cost of collection and disposal will represent an expenditure of funds on the part of the municipality that must be provided for in the budget of expenses.

Character of Wastes.—Municipal wastes may be divided into ashes, garbage, rubbish and street sweepings.

Ashes consist of the material discarded after the combustion of coal or other fuels in household heating and cooking devices or under the boilers of manufacturing plants. Ashes are usually free from organic matter, unless foreign materials have been mixed with them. In Northern communities where coal is the chief source of fuel, there may be found a considerable percentage of unburned coal in the ashes. In cities where wood is the chief fuel used and where weather conditions are less severe, the amount of combustible matter in ashes and the unit production will be less.

Garbage consists of the waste material from household, hotel or restaurant kitchens, and the animal and vegetable wastes from groceries, markets and similar establishments. Included in its composition are compounds which undergo putrefaction almost immediately, and unless garbage is removed regularly and frequently, conditions of a distinctly insanitary nature will develop at the point of storage. Because of its composition, garbage is one of the most important of the municipal wastes, and its removal and proper disposition present the greatest difficulty. Garbage varies with the seasons of the year, with the location of the community producing it, and in different districts of the same municipality. The character of the population has a marked effect both on the quantity and quality of the garbage produced. The greatest

production occurs in the summer months and early fall, the minimum amount in winter. The average yearly per capita production of garbage is approximately 150 pounds. Garbage contains the most valuable properties of any of the municipal wastes. Grease may be recovered by reduction, and the remaining residue worked up into fertilizer or into feed for animals. Garbage without any treatment has some direct fertilizing value when applied to land. Fresh garbage, mixed with inedible or poisonous material, can be fed to animals.

Rubbish consists of the portion of household wastes that cannot be included under ashes or garbage. The mixture is of a non-putrescible, combustible nature, and includes paper, wood, glass, crockery, metals, leather, rags and other discarded household material. In some cities rubbish is sorted, a portion sold, and the remainder, consisting of a large proportion of combustible matter, burned to furnish power for operating plant machinery, lights, and some plants are able to supply outside sources with steam.

Street sweepings consist of the material, in the form of dust, worn from road surfaces by the abrasive action of traffic passing over them, horse droppings and a mixture of other materials, matches, paper, fruit skins and miscellaneous material thrown upon the streets. In the fall the quantity of this waste may be very materially increased by leaves in these sections laid out with shade trees.

Methods of Collection.—Of the four classes of municipal wastes, the street sweepings are usually collected separately with special equipment, and in the majority of cases by city forces. Street sweepings usually do not contain sufficient putrescible matter to preclude their use in filling low areas. The finely divided material in the mixture may give rise to objectionable conditions from dust in the vicinity of the point of disposal.

Ashes, garbage and rubbish may be collected separately, in various combinations or all together. The choice of the collection system, separate or combined, depends upon the method of final disposal. Many of the larger cities collect garbage, ashes and rubbish separately. Garbage is disposed of by reduction, or feeding to animals, the ashes used in fills and

the rubbish sorted for the recovery of saleable material and the remainder burned. In some cities rubbish contains sufficient saleable material to show a credit over the cost of separation, while in others the cost of sorting would not be paid by the sale of the materials recovered. In smaller communities where reduction would not be feasible because of the small quantity of garbage, considerable revenue has been obtained by separating this material and feeding it to hogs. The ashes and rubbish are collected together or separately, and used in fills. This system of separation can be used with nearly all methods of disposal. Where ashes are collected separately and garbage and rubbish combined, the method selected for disposal is incineration for the combined wastes, and the ashes are used in fills. For combined collections of the three classes of wastes, final disposal is by dumping in fills or by incineration. Considerable difference of opinion exists as to the best method of collection, but local conditions should be made the deciding factor in determining the best method for any locality.

For the proper and efficient collection and disposal of municipal wastes there should be provided a sufficient appropriation for carrying on the work effectively, rules and regulations by the municipality covering the separation of wastes, type of receptacle to be used, location, time of collections, frequency of collection, and efficient organization to carry out the work in a sanitary and economical manner, and means of educating the public to secure its best co-operation. It is beginning to be the concensus of opinion that municipal collection is more satisfactory and economical than collections by contract. The collection organization under city control is more flexible and better able to meet changing conditions than is the organization under a contractor where certain definite requirements and equipment have to be specified. Under city control the organization is built up looking toward future changes in conditions. With short-time contracts the price paid must either be excessive to cover the cost of the investment for equipment or the equipment supplied will be exceedingly poor. The city has the necessary legal authority to enforce regulations which is lacking on the part of the contractor. The cost of collection is so affected by the many local

conditions that any attempt to compare the economy of systems is exceedingly unsatisfactory.

Methods of Disposal.—The methods of refuse disposal consist of dumping into water, dumping on land for fills, and incineration, applicable to all classes of wastes; burial, applicable to garbage and street sweepings; feeding and reduction, applicable to garbage only.

Dumping in Water.—For the larger seaboard cities dumping into water offers one method of refuse disposal. In theory, the principle is to have a body of water sufficiently large to dilute soluble matter, allow the heavier particles to settle, and provide sufficient surface so that floating material is scattered. Unless material is transported long distances off shore, tidal currents and wind bring the material back to the shores and cause considerable nuisance. The cleanest material has a tendency to settle, while the foulest remains on the surface to be carried about by currents and wind. This method of disposal is applicable only to the largest communities, because of the expense of hauling to the dumping area. Dumping into lakes and rivers invariably causes nuisances. Fish life is destroyed, nuisances are created along shore or down stream, banks are built up, obstructing channels, and lawsuits usually result.

Dumping on Land.—Where refuse is disposed of by dumping on land, low areas are usually selected which will be benefited by being brought to grade. Garbage alone cannot be used in such fills. Putrefaction, accompanied by extremely objectionable odors, takes place; the disposal area becomes a breeding place for flies, the source of supply for the community, and rats, dogs, cats and birds are attracted in large numbers. Ashes make excellent fills along water fronts, in the grading of streets and for building sites. The chief objection is from fine dust blown about during dumping. Rubbish can be disposed of in fills, but contains considerable combustible material which is liable to take fire and burn or smolder for a long time, giving off objectionable odors. In combination with ashes or ashes and rubbish, garbage may be covered and successfully disposed of in fills. All dumps located close to built-up areas should be carefully supervised

to prevent nuisances and insanitary conditions. Very often the privilege of sorting over rubbish is given in return for the supervision over fillng.

Burial.—Disposal by burial is applicable to garbage, dead animals and street sweepings, if they contain a high percentage of horse manure. For garbage disposal, two methods are employed: (1) Scattering the material in thin layers on the surface of the ground and plowing under. (2) Depositing in trenches and covering with the excavated soil. The latter method would seem preferable, as less material is likely to be left uncovered. Considerable fly breeding should be expected on garbage burial areas. Eggs brought in with the material develop into larvæ, pupate, and on hatching appear on the surface. At times the area will be covered with newly hatched flies whose wings have not dried sufficiently to be able to fly. At such times many birds will be attracted to the dump. At Columbus, Ohio, garbage was disposed of by burial from 1906 to 1910. For a population of 175,000 about fifteen acres per year were required for disposal.

Incineration.—As the word implies, incineration is the destruction of refuse by fire from the combustible material contained in it, or by fuel supplied from other sources. The process is applicable to the disposal of all classes of refuse. From a sanitary standpoint, incineration is a most acceptable process. If carefully carried out in properly designed and constructed furnaces, in which the temperatures are sufficiently high to decompose the gases given off, the process can be conducted without objectionable conditions arising. In a well operated plant there remains ash or clinker, containing no organic matter, which theoretically has some value for fills or road construction. During incineration, heat is developed which may be utilized, with the proper installation of boiler equipment to generate steam to operate machinery around the plant, and in some instances generate enough additional to supply an outside source. In the smaller communities the incineration of garbage alone meets with much favor, because this class of material, being not so bulky, and being much more liable to give rise to objectionable conditions, is the only waste that is efficiently and systematically collected. Garbage

containing between 80 and 90 per cent moisture requires for its cremation, when disposed of separately, considerable amounts of fuel to evaporate the water so that the organic matter will burn, and it is evident that the cost of fuel for the incineration of garbage by itself will be quite high. Rubbish contains a large percentage of combustible material, has a low water content, and is easily disposed of by incineration without additional fuel, even if sorting is practiced before burning. Where garbage and rubbish are collected combined, there is usually enough combustible matter in the rubbish to evaporate the water in the garbage, so that the organic matter will burn. Starting the furnace each day to raise the temperature sufficiently to start proper combustion may require fuel other than that contained in the refuse. Several types of plants for the incineration of refuse have been developed, many of the construction features being patented, all accomplishing the same end, but differing in construction details and operating methods, depending upon the character of the material to be burned.

Feeding.—Where garbage is used for feeding, certain changes are necessary in the separation and collection of the material that are not required where other methods of disposal are practiced. The garbage should be separated from tins, cans, shells and broken glass, and should be well drained. Collection should be more frequent, as the fresher the garbage, the higher the food value.

The size of herd should be sufficient to care for the maximum amount of material. It is estimated that 100 animals ranging from pigs to large sows will consume a ton of garbage a day. Experiments at Washington, D. C., have shown that a gain of about a pound per hog per day may be expected.

Local conditions so affect the cost of feeding that comparisons of cost figures are confusing. Worcester, Mass., with a population of about 200,000, has a hog farm of 40 acres about six and a half miles from the center of the city. Collections of garbage are made twice weekly, hauled to the farm and fed to an average of 2,000 hogs. During the thirty-six months' period, between December, 1916, and November, 1919, the expenditures over receipts for the collection and disposal of

garbage amounted to $99,000. With an estimated population of 200,000, the cost was about 17 cents per person per year. On the other hand, private pig raising companies have been forced to break their contracts. The return from pig feeding will depend to a large extent upon the supervision exercised over feeding.

Reduction.—Reduction applicable to garbage disposal consists in treating the material so that a separation of the liquid and solid portions takes place and grease is recovered from one or both of them. The products resulting from reduction are grease, waste water which may or may not contain putrescible organic matter in solution, gases produced in the cooking process, liberated and escaping into the air, and tankage or solid residue. Grease and tankage have a market value and are readily disposed of. The process consists of cooking the garbage with steam in digestors, pressing to separate liquids and solids, and recovering grease from the liquids by settling and skimming, and from the solid portion by grease solvents. During the process very objectionable odors may be given off, and most reduction plants, unless far removed from built-up sections, will at times create nuisances. The liquids wasted, which are high in organic matter, are also liable to cause nuisances unless properly disposed of. The reduction process, as a method of garbage disposal, is only suitable for the larger communities. To be feasible, there should be available the garbage from a population of between 75,000 and 100,000. The plants consist of a large amount of complicated, patented and expensive machinery, on which depreciation is high because of acids present in the garbage. During the past few years the cost of installing reduction apparatus has been so high that several large cities have turned to feeding animals as a means of obtaining some revenue from this class of waste to lower the cost of collection and disposal. If in the cost of operation of reduction plants there is included besides actual operating expenses the interest on the investment and depreciation on the plant, it is doubtful if more than one or two plants will show a profit in disposing of garbage by this process.

For the city endeavoring to solve its refuse collection and disposal problem, it is useless to figure how a profit may be

obtained, but to figure how it may be accomplished with the fewest objectionable features and at the minimum cost. While the largest cities may resort to special methods for separate wastes and the small ones to hog-feeding or burial outside the built-up area, the most promising method for the disposal of all classes of wastes in the majority of communities would appear to be by a good incinerator with no special attachments and of such design that it will burn all classes of wastes without odor, and which can be operated under intelligent supervision to reduce the cost of upkeep and repairs.

SITUS INVERSUS VISCERUM TOTALIS.*

By LESTER J. WILLIAMS, M. D., Baton Rouge.

In searching the literature of medicine for cases of transposition of viscera, one is confronted by the paucity of reported cases from X-ray examination alone. The largest number of cases in literature is in connection with surgical operations, and even almost as many from autopsies; but of all cases of situs inversus reported, those detected by X-ray findings only are very few. With a desire to add my small quota to the number of published cases, I am presenting two cases—one a boy of nine, the other a secundipara of 30, both with a complete transposition of all viscera.

Etiology.—I think it is conceded that in tracing a cause for this interesting anomaly one must necessarily find one that operates at a very early period of the development of the embryo. Conklin advances a theory which he applies to the development of the mammalian ovum, based upon his observations in a certain species of snail. In this particular invertebrate the transposition of organs is a normal one, and can be traced back to the earliest stages. He concludes that the inversion of the polarity of the ovum is responsible for the condition, as in the ovum there is probably a distinct polar differentiation.

McMurrich has observed that with double monsters one is the exact counterpart of the other, with the exception of a

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reversal of its organs, or, as he terms it, "looking-glass counterpart." The conclusion from this is that all cases of situs inversus were originally twins, formed by the division of a single embryo, one of which, having ceased to develop, undergoes degeneration. Sometimes this product of degeneration is included within the body of the apparently single individual, especially if the separation were an incomplete one.

Karashima is of the opinion that malformations occur from trauma during the latter period of embryonic life, while Mall is convinced that germinal and hereditary influences have no effect upon the formation of monsters, and thinks that they are produced from normal embryos by "influences which are to be sought in their environment."

There is another view accepted by some of our learned scientists that deflection of the primary heart to the left is the primary morphological factor that produces transposition of the viscera. This theory is supported by the research work of Kolliker, Dareste and others. The experiments of Fol and Warynski seem to bear out the theory also.

No theory, however, so far presented is free from criticism, and in mentioning the above I am recording the speculations of the past in the hope that the wisdom of the future will solve the cause of situs inversus.

Historical.—The first case of complete transposition of viscera was probably observed by Riolanus in 1650, although the most celebrated case was Morand's in 1660, also described by Mery. Aristotle, however, has the honor of beginning the discussion of this bizarre anomaly by mentioning two cases of transposition of liver and spleen in animals. The first to make a special study of these cases was Cornelius Gemma, of Antwerp, in 1769. The discovery of auscultation in 1819 marked a decided advance in the study of such cases, and five years later Kuchenmeister began a discussion of cases of situs inversus after a thorough examination by the then new method of auscultation. To Karashima we are indebted for a catalogue of cases of transposed viscera, practically complete to the publishing of his article in 1912, and while his list is compiled with care and thoroughness, there are probably some omissions from the published cases. Upson, of Battle Creek,

and Lineback, of Atlanta, are among the later writers to give this subject deep consideration, and their writings form no small part of the literature of this subject.

Albers, Baron, Beclard, Boyer, Bull, Mackensie, Hutchinson, Hunt, Murray, Dareste, Curran, Duchesne, Musser, Sabatier, Shrady, Vulpian, Wilson and Wehn are among others reporting instances of transposition and inversion of viscera.

Report of Cases.—I am indebted to Dr. Louis E. Bergeron for referring the case of the nine-year-old boy, whose case history follows:

L. D. B. weight 46 1-2 pounds, 47 inches tall, presents the appearance of an undersized, keenly intelligent white boy.

Family history: Father living and in good health, age 45; mother in good health, 36 years old. Both maternal grandparents died of apoplexy. Father's father's age 72, living and in good health; father's mother died of pneumonia at the age of 70. No brothers, two sisters, one 11 years, good health, the other 7, a Mongolian idiot, now showing some signs of improvement in condition. No tuberculosis, insanity or syphilis in family.

Past history: Pneumonia with entero-colitis at eleven months; measles followed by broncho-pneumonia at two years; mumps at six years. During the first attack of pneumonia Dr. Bergeron discovered the dexiocardia.

Physical examination: Lungs: Negative. Heart: Dexiocardia, no valvular lesions. Liver: Left side, otherwise negative. Spleen: Negative with exception of position on right side. Eyes: Normal reaction to light and accommodation. Throat: Hypertrophied tonsils. Patella reflex: Negative. Uranalysis: Negative. Wassermann: Negative.

X-Ray examination: Heart: A perfectly normal heart for a boy of nine years, except that there is a complete transposition, the apex extending into the right chest, while what in normal individuals would be the right side of the heart extends beyond the midline to the left.

Aorta: A complete reversal of the aortic shadow is seen; on the left side is noted the superior vena cava and the ascending aorta. On the right the descending arch of the aorta and pulmonary artery.

Lungs: Nothing abnormal discovered, the costophrenic sinuses are clear.

Diaphragm: The excursion of both normal. The left diaphragm is higher than right.

Liver: Fluoroscope shows liver on left side.

Stomach: The cardiac end of the stomach is on the right side, the pyloric on the left. The lower portion of the greater curvature is slightly above a line drawn through the crests of the ilia.

Duodenum: The duodenal cap is about 12mm. to the left of the third lumbar vertebra, the duodenum from this point extends downward and to left, thence to right. The duodeno-jejunal junction or bend is found to the right of the midline.

Colon: Without an exception every portion of the colon is reversed, the terminal ileum occupying a position on the left that it normally holds on the right. The cecum is on the left with the

ascending colon. The hepatic and splenic flexures occupy reversed positions, the hepatic flexure being on the left side under the ninth costal cartilage, the splenic flexure on the right about the level of the eighth costal interspace.

Appendix: Visualized at 6-hour observation, but not visualized at 12 and 24-hour observations. Located in left iliac fossa. Not sensitive to fluoroscopic palpation.

To Dr. Jos. W. Watson I am indebted for referring to me the following case of situs inversus viscerum:

Mrs. W. D. B., age 30, married 12 years, weighs 150 pounds and height sixty inches, presents the appearance of a short, stout white woman of Spanish type, healthy in appearance.

Family history: Mother died at the age of 59 during menopause; father died at 55, cause of death—cirrhosis of liver and chronic interstitial nephritis. The patient remembers that her father was given large doses of mercury, so the antecedent strain of lues enters into the consideration of this case. Three sisters and one brother, all died under the age of seven.

Personal history: Menstruated at age of 14, normal since, until two years ago, when periods became rather irregular. Married at age of 18; husband living and in good health. Has had no miscarriages. Two children, one 8 years, the other 13 months, both in good health.

Past history: No history of typhoid fever. Has never been jaundiced. One slight attack of influenza three years ago. Malaria several times, and patient dates illness from first attack of malaria four years ago. No operative history.

Present illness: Four years ago, following an attack of intermittent malarial fever, patient noticed a feeling of numbness and tingling in entire body, with pyrosis and sense of oppression. She is of a nervous temperament, and with the rapidity of heart's action becomes very much excited during the attacks, fearing death. Indigestion, marked by nausea and vomiting, accompanies the nervous attacks. This is not dependent upon the ingestion of food, but sometimes occurs with the stomach empty. Bowels very constipated. The patient becomes very sleepy with the attack, but fights against sleep on account of the terrible dreams she invariably has.

Physical examination: Lungs: Negative.

Heart: Dexiocardia, no valvular lesions.

Spleen: Located on right side.

Liver: Left side, somewhat higher than normal.

Eyes: Normal reaction to light and accommodation.

Throat: Negative.

Patella reflex: Normal.

Uranalysis—Negative.

Wassermann: Negative.

X-ray examination: Heart: Negative, with the exception of a complete reversal; the base is on the left, with the extreme border 4mm. to the left of the left sternal line, while the apex points to the right. About three-quarters of the organ is on the right side.

Aorta: The descending arch of the aorta and pulmonary artery are found on right side, while the shadows noticed on the left are the superior vena cava and the ascending aorta. This forming, with the transposition of the heart, a true dexiocardia.

Lungs: The diaphragmatic sulci shadows are clear, the lungs show evidences of a post-influenzal fibrosis.

Diaphragm: The left diaphragm is higher than the right. Excursion of both normal.

Liver: The shadow of the liver is seen on the left side.

Stomach: The stomach is of the orthotonic type, with normal peristaltic waves, its lower portion corresponding with the height reached by the iliac crests, its cardiac orifice extremely to right, while the pylorus occupies a position in the midline slightly lower than midway between the suprasternal notch and the symphysis pubis. Contents of stomach completely evacuated in 6 hours.

Duodenum: The cap is anterior to the third lumbar vertebra, the second position extends upward and to left, thence downward and to right. The duodeno-jejunal junction or bend is slightly to left of midline.

Colon: While a complete reversal is noted, the descending colon is not placed as far from midline on the right as it normally occupies on the left; that is, the splenic flexure on the right side is about midway between the median line and mid-auxiliary line. The hepatic flexure is on the left side with ascending colon and cecum. There is stasis throughout the entire colon.

Appendix: At 24-hour observation cecal stasis is observed. The appendix located in the left iliac fossa shows stasis, is patulous and is sensitive to fluoroscopic palpation.

Comment.—In reviewing this paper the lack of a plausible cause or reason for situs inversüs is most apparent, the mystery remains unsolved, and leaves us like Mahommed's coffin, suspended between heaven and earth. No theory so far presented is any more plausible than the following quatrain anent the celebrated case of Morand's in 1660:

"La nature, peu sage et sans doute en débauche,
Plaça le foie au côté gauche,
Et de même, vice versa,
Le cœur à la droite plaça."

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DISCUSSION.

Dr. L. J. Menville, New Orleans: I certainly feel Dr. Williams is to be complimented on the manner in which he has worked this subject up. The practical value of the problem lies in the fact of being able to determine the exact location of the internal organs of the body.

I remember several years ago an individual who was suffering from pain in the right lower quadrant of the abdomen, his condition having been diagnosed at the time as chronic appendicitis. He left town, and about two months ago he was in New Orleans suffering from pain again in that region, and while under treatment a surgeon recommended the removal of the appendix. He was X-rayed, and we found the appendix was in the left lower quadrant of the abdomen rather than in the right. Naturally that precluded the possibility of a chronic appendix.

CANCER PROPHYLAXIS.*

By J. C. WILLIS, M. D., Shreveport, La.

Perhaps no problem in either medicine or surgery within the past decade has been given more consideration, more study, and, I might add, has met with more practical results than this so-called cancer problem, not even excepting tuberculosis, and while by no means do we contend that our investigations have fully solved the problem or given us the ultimate cause in the etiology of cancer, we do know that they have supplied us with so many indisputable facts as to both what it is and what it is not, that we are now enabled to formulate a method of attack which if intelligently and energetically pursued will result in the recovery of many cases that have heretofore been hopelessly beyond our aid. Perhaps our knowledge of what cancer is not, is of as much practical importance to us in dealing with the different phases of this problem, as our real knowledge of the disease itself. In the first place,

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we know now that cancer is not due in the sense that infectious disease are, to a parasite. We know that cancer is not communicated from one person to another. We know now that the influence of heredity in the incidence of the common forms of cancer in the human being is so remote that the factor of inheritance may as a rule be disregarded. We know that cancer is not primarily a constitutional disease, but purely a local one, and only after a length of time, varying from months to years, according to its nature and location, does it become constitutional by being disseminated through either the blood or lymph channels. We know now that many forms of cancer have been brought in relation to some form of chronic irritation as either a direct or indirect predisposing influence, and that cancer of the cervix, the lip, the tongue, the rectum, the stomach and many of the malignant forms of disease of the skin are all clearly associated in their inception with one form or another of repeated and chronic irritation. It has also been shown in the laboratories that rough compression and manipulation of a malignant tumor are fully capable of setting its cells free to form metastases, which fact should teach us that we must use the utmost gentleness in handling them for diagnostic purposes.

With knowledge thus acquired, the most important factor in connection with any disease has also been demonstrated in connection with cancer; that is, that it is both largely a preventable and curable disease. In a way most of us know this, just as we know that a diffuse general peritonitis caused by a ruptured appendix is preventable by making a diagnosis of the primary cause and removing the appendix before it has ruptured; or just as we know that an acute obstruction of the bowels from a diverticulum is preventable by removing the obstructing agent before a pathology has been produced that makes a recovery impossible. Yet in spite of this knowledge on our part, it is estimated that more than a hundred thousand people died of cancer in its various forms in the United States alone last year, and perhaps as many more will succumb to this disease the present year. In February, 1917, the National Council of the American Society for the Control of Cancer appointed a committee to prepare a manuscript for a handbook of cancer for circulation among the medical pro-

fession, in the end that the mortality from cancer might be reduced by giving to the profession a more accurate knowledge of the disease. This has been followed by other propaganda which has evidently had some effect, for a number of State medical societies, including our own, have cancer research committees, a part of whose duty it is not only to gather facts as to the advance in our knowledge of cancer, but also to teach the lay public many things that they should know about it. And it stands to reason that we must first get the co-operation of the public, or we will fall far short of our purposes. Evidently and without question, the family physician cannot give advice of any practical use in these cases unless his advice is first sought, and we must get this co-operation of the public if we are to have the full benefit of our present knowledge of the disease, and to say to a layman that cancer is curable in the early stages is not sufficient, for he has no knowledge of what constitutes an early stage. But it is not possible for us to teach him the nature of these influences, which we know by experience and from observation that may lead to the development of cancer, and then follow this up with instructions as to what constitutes prophylaxis, as well as those conditions which show that cancer has already developed. When we have done this, we shall have accomplished much toward solving this so-called cancer problem.

Unfortunately, many people believe cancer not only to be incurable, but hereditary as well. They regard it as a stigma upon their otherwise good family name, and think that it should be referred to only under the direct stress of circumstances, and then only under the strict censorship of the family physician. (All of us have had that experience.) They tell us in the most strictly confidential manner that one or more members of their family have died of cancer of some organ; and for that reason, and often for that reason alone, they are afraid that they will sooner or later succumb to the same trouble. As a consequence, they go through life thinking not only of themselves as inevitable victims, but are morbid in the thought that they in turn will transmit this stigma to their own children. Evidently these people are entitled to the facts as we know them. However, they should be taught also that every mole, wart, tumor, birth-mark and chronic ulcer is a

potential cancer, and should receive both prompt and proper treatment. Dr. Bloodgood, of Johns Hopkins Hospital, is authority for the statement that of twelve hundred cases of cancer of the skin and mucous surfaces observed in that institution, every one of them had been preceded by a lesion before the development of cancer.

To tell the average layman that cancer is curable in its early stages is usually unintelligible to him, because he is thinking of a clinical cancer and you are talking about a biological one. He probably calls to mind some acquaintance, friend or possibly a member of his own family who has been afflicted with cancer, and perhaps operated on without results, and naturally he is skeptical. It is then our duty to teach him the difference between biological and clinical cancers; in other words, we should teach him prophylaxis as well as those indications which show that the disease has already developed. Dr. Mayo is authority for the statement: "No one has yet seen a cancer of the skin or mucous membrane of the body which was not preceded by some form of chronic irritation, and investigation of the inner surface of the body reveals the same condition, always preceding cancer." This being true, clearly then we are notified before the storm breaks, and it is our duty not only to interpret their significance, but to teach the public, who is dependent on us for guidance and protection, of this significance as well.

According to available statistics, cancer of the stomach is the most common form of malignancy. Welch is authority for the statement that cancer of the stomach is responsible for one per cent of all deaths of persons past the age of twenty, and in a study of the post-mortem diagnoses of the chief cause of death of three thousand persons Cabot observed that eighty-three died of cancer of the stomach (two and three-fourths per cent). Friedenwald, in giving statistics of deaths in the city of Baltimore for the year 1913, from the seven organs most frequently involved, primarily showed the following results of white male and female:

	Male	Female	Total
Liver	21	47	68
Stomach	71	47	118

Female organs		69	69
Breast		39	39
Esophogus	10	6	16
Rectum	11	9	20
Intestines	9	18	27

We thus observe from these statistics that the city of Baltimore, which I think a fair criterion for the rest of the country, furnishes more deaths from cancer of the stomach alone in white males than it does deaths of white females from cancer of the organs of generation, and more deaths of white females from cancer of the stomach than it does from cancer of the breast, which is the most common form of cancer in the female next to cancer of the female organs of generation, with the exception of cancer of the stomach, as noted above. Undoubtedly the principal cause of this high mortality of cancer of the stomach is due largely to conditions which preclude an early diagnosis of the disease, for unfortunately a large proportion of the early symptoms of cancer of the stomach do not differ materially from many of the ordinary forms of so-called indigestion, and are treated as such until the golden opportunity has passed. This opportunity to obtain an early diagnosis necessarily prevents the institution of the only treatment, surgery, by which we may hope to effect a cure. Inasmuch as the mortality of cancer of the stomach is proportionately large, it is most important that we emphasize these facts, which may lead to a reduction of the death rate from this affection, and Bloodgood aptly suggests to us that as we have trained ourselves to remove the appendix in order to possibly prevent the patient from dying from peritonitis in cases of appendicitis, even when the patient is suffering little or no discomfort, and often when the attack has been very insignificant, even so must we educate both ourselves and the patient suffering from internal cancer that we operate not so much for symptoms or pain, but to save him from death. Fortunately, we have at our command now the X-ray and fluoroscope, which if resorted to early, under proper conditions, are of the greatest benefit to us in making a timely diagnosis in these cases, and we should lose no time in having every case of obstinate indigestion that cannot be attributed to some other known cause placed in the hands of an expert radiologist for diagnostic purposes; and when the

diagnosis (or even probable diagnosis) is made, we should insist upon a radical operation, or at least an exploratory one in doubtful cases, if we are to reduce the mortality of this disease.

Because of the campaign for the education of the public, the mortality from two forms of cancers have been greatly reduced in the past decade. I refer to cancer of the uterus and of the breast As a result of information thus gained, hundreds of women are daily consulting their family physicians or surgeons and submitting to examination and operations for conditions which they formerly accepted as a natural course of events governing their lives, for they are being taught that practically every abnormal lump or tumor of the breast, if not already a clinical cancer, is a potential one, and should be treated as such; they are being taught that tears of the cervix as a result of child-birth produces favorable conditions for the development of cancer and should be repaired, and that every case of irregular hemorrhage from the uterus, especially in women more than thirty-five years of age, should be investigated, and every persistent and so-called "change of life" hemorrhage should be looked upon with extreme skepticism. And, most emphatically, no suspicious tumor of the breast under any circumstances should be removed without the surgeon being prepared to have a frozen section promptly made, and prepared to do the radical operation preferably under the same anesthesia, provided the report is positive for cancer. Dr. Bloodgood, in one of his remarkable essays on cancer, tells us that Dr. Agnew, the eminent professor of surgery of the University of Pennsylvania, honestly admitted in one of his last clinics at the University Hospital in 1890 that in an experience of forty years with hundreds of operations he had never permanently cured a cancer of the breast. And why? Because he operated only on clinical cancers of the breast and did not do the radical operation. His students are today curing twenty-five per cent of their cases of cancer of the breast by doing both early and complete operations, and preventing many more by the timely removal of innocent-looking "lumps" of the female breast.

Mistakes in diagnosis from lack of careful examination is the most common cause of failure to recognize malignant diseases

in time for a curable operation. According to Dr. William J. Mayo, "fifteen per cent of the cases of cancer of the rectum which come to the Mayo Clinic have previously been operated on for either hemorrhoids or stricture, or both, and could have easily been diagnosed as such had the operating surgeon taken the necessary pains." Many cases of malignant ulcer have been and are still being treated for syphilis until they have passed beyond the hope of operative measures, when its nature could have easily been cleared up by a negative Wassermann reaction: at least it could have been demonstrated as being non-specific, and it is no longer justifiable nor permissible to subject a patient to a prolonged course of anti-syphilitic treatment for diagnostic purposes, but the physician should ascertain at once if a given lesion is syphilitic or not and not lose valuable time in useless medical treatment. The same applies to every condition in which we are in the least doubt, for we should not be satisfied until we have exhausted every means at our disposal to discover the real nature of the disease in question, that we may not lose valuable time in instituting the proper treatment. Therefore, does it not behoove us to show the greatest vigilance and alertness to detect the first danger signals of a malady which in its early stages is certainly curable that later may or may not be amenable to treatment and when advanced is necessarily fatal?

DISCUSSION.

Dr. S. M. D. Clark, New Orleans: This is a subject in which I have always been interested, and I am delighted to have heard Dr. Willis call attention to it again. I think we owe a great deal to the past. We have learned much from our forefathers in medicine, but we also have inherited certain legacies that have been most damnable from the standpoint of advancing modern ideas, and I refer especially to cancer of the uterus and the menopause. Women have an idea that it is normal for them to have hemorrhage during the menopause. This idea is passed down to them from their mothers, and it is not easy to uproot. I have done my best with my clients to uproot it, but it will take years before this erroneous impression is eradicated.

We cannot co-operate without the public. We cannot do anything until we get medical men keyed up to the point of early recognition of the disease. I do not speak at random, but absolutely from evidence that I secure in my clinic, and it is amazing today to see the number of women go to doctors who think they have change of life and menstruate and have bleeding, and the doctor tells them not to worry about it. That is criminal. It is like a railroad engineer running past a red light on an open bridge on account of his absolute lack of knowledge. Therefore, I think

we have got to pluck the mote out of our own eye and be on the alert for the detection of this. In women with leucorrhea or prolonged menstruation, signals of danger, we must make a careful examination looking for this disease.

Dr. Ernest S. Lewis, New Orleans: I want to emphasize what has been stated by Dr. Clark. I recall in the past many women sent to me in the last stages of cancer of the uterus, with a history of irregular and profuse hemorrhages ascribed by the physicians consulted to change of life, Without examination they were given ergot, told to douche with hot water, and rest. After many months without relief the physicians would again be consulted and asked for a local examination, which in many instances showed the cause of the hemorrhages to be due to cancer. These patients would then be hurried to the city to consult a specialist, who in most instances could do nothing, as they proved inoperable cases. There might have been an excuse when, I believe, I was the only specialist in the State and gynecology was in its infancy. No such excuse exists at present. The change of life is not attended with irregular hemorrhages in a perfectly normal and healthy woman. There is always a cause, constitutional or local, and the physician who fails to make an examination when consulted for irregular hemorrhages at about the change of life fails in his duty or betrays ignorance.

Dr. J. C. Willis, Shreveport (closing): There are too many cases of advanced cancer in our clinics and charity institutions, and we have got to be more careful in our examinations if we would cure them.

SOME FRACTURES OF THE BASE TREATED BY REPEATED SPINAL PUNCTURES.*

By DR. L. B. CRAWFORD, Patterson, La.

Because of their accessibility to bacterial invasion, their inaccessibility mechanically, fractures of the base are very difficult to cope with. We were long of the belief that these fractures were invariably fatal, and treatment other than cerebral sedatives, quiet and darkened rooms was little dreamed of.

Let us for a moment consider the theory of the forces causing these fractures. Rawlins (*London Lancet*, 1904) states that any force which presses the opposite poles together tends to burst the skull along the lines of the meridians, and as the base offers the least resistance, the fractures are more often found here than over the vault. I am convinced of the soundness of this statement, though I must confess that I hate to give up the old theory of countrecoup; it is one that appeals to all of us. So also does the theory of, one might say, in-

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direct violence, as force transmitted through the spine to the base in the same manner as the head of a hammer is forced down by striking the handle.

It has been estimated that 70 to 75 per cent of all fractures of the vault are accompanied by basal injuries; that all fractures of the skull are in 60 per cent of the cases due to falls from heights, and that fully half of these involve the base. In my 10 cases, 4 fell from scaffolds in the holds of ships, 4 were struck by falling trees, 1 was crushed between cane cars, and 1 was thrown from an automobile.

Crandon and Wilson analyzed fractures occurring from 1864 to 1906 in the Boston City Hospital and found a total of 1436 fractures of the skull; of these, 530 were of the base, 299 recovered, and 231 proved fatal. They estimated that 74 per cent, or 395 of these cases, had hemorrhage from at least one orifice, and the order of frequency was one ear 281, nose 168, sub-conjunctival 53, both ears 47, and mouth 44. In all of my cases was this hemorrhage present, in the ear in 7 cases.

The escape of spinal fluid is, of course, conclusive of fracture. They found it present in 27 of their cases. Though most text-books lay much stress upon its appearance, it is in reality only present in about 5 per cent of the cases.

Fractures of the vault are more often compound than fractures of the base, and they all seem to occur with equal frequency in frontal, parietal and temporal bones, while basal fractures are much more common in the mid-cranial fossa. We seldom see a compound fracture of the posterior fossa, while, on the other hand, we rarely see a simple fracture of the anterior and middle fossa.

The old rule of Bergmann and Wagner that if the patient survives the first 48 hours the prognosis is good, still holds true; but one must remember that fully 8 per cent of these cases that do survive this period succumb from intermediate complications of meningitis or abscess. Should the line of fracture traverse the sphenoidal or ethmoidal sinus, the dangers from bacterial invasion are great, the chief offender being the pneumococcus, as against the streptococcus and staphylococcus which we find in infections of the vault.

The prognosis must necessarily be guarded, an insignificant fissure of the base with focal hemorrhage in the pons or medulla may cause instant death, while an extensive fracture involving a so-called "silent area" may make an uneventful recovery. Rawlins lays stress upon the temperature chart. At first there is a variable period of subnormal temperature; this is the shock stage, and "hands off" is the watchword at this time. The patient may succumb during this stage, or he may react with a rise of temperature. Should the temperature moderately fall, the prognosis is good; if it holds its elevation, the prognosis must be held in abeyance; should it gradually rise, the termination is usually fatal, as is certainly true when it rapidly rises beyond bounds.

It is not always easy to recognize basal fractures, because it is very difficult to obtain direct evidence of bony lesions. We in a great many instances must be led by the evidence of intra and extra-cranial bleeding.

Intra-cranial extravasation, due to tearing of the dura, takes place in the subdural space and can be recognized by finding red blood corpuscles evenly distributed in the cerebro-spinal fluid. Should there be blockage of the fluid in the neighborhood of the foramen magnum, blood of course will not be found with the puncture; there have been several instances of this type reported.

Extra-cranial extravasations occur as bleeding from the nose, mouth and ear, or ecchymosis, which appear usually hours or even days after, in the orbit, under the eyelids or conjunctiva, when the anterior fossa is involved, or even in the mastoid process or down the neck, if the potserior fossa is involved. The escape of cerebro-spinal fluid from any of the sinuses is, of course, positive proof; in none of my cases was it present. I cannot see why this should give grounds for alarm, because undesirable pressure may be relieved in this way.

Involvement of the cerebral nerves often proves of diagnostic value. The facial is by far the one most commonly involved; diplopia, due to injury of the oculomotor nerves, frequently follows; so also do we find the olfactory and optic suffering from direct injury. In two of my cases a traumatic glycosuria was present. Higgins and Ogden found this present in 9 per cent of their cases.

Experiments show that 3 to 6 per cent of the cranial capacity may be taken up by a foreign body without producing compression symptoms, owing to the escape of a corresponding quantity of cerebro-spinal fluid into the spinal canal. This evidently explains why a certain proportion of these cases recover if left alone. Any increase above this per cent results in compression symptoms, and a fracture involving the posterior fossa gives rise to compression symptoms earlier than a fracture in any other region.

In treatment of fractures of the vault the indications for surgical intervention are clear-cut and are not particularly aimed at the relief of critical cerebral complications, but rather to the removal of bony deformations; the reverse is true of basal fractures; we are not so exercised at bony deformity, but rather at the more serious intracerebral complications. To Cushing most of the credit is due for a more comprehensive treatment of these cases. His sub-temporal decompression is aimed at a release from the effects of the lesion by an opening in the skull and dura. He states that there are seemingly two other less radical measures, but both have their elements of danger—namely, lumbar puncture and venesection, with a purpose of depleting the brain and lowering blood pressure. The typical operation, as described by Cushing, one seldom finds adhered to; there are all manners of flaps, incisions and bony defects, and I do not hesitate to state that no doubt for this reason the popularity of this procedure has suffered. In 1908 he adopted this sub-temporal operation to basal fractures and advocated the insertion of a rubber drain well into the base of the skull and coming out of the lower angle of the wound. I do not think it amiss to quote from him. The claims for his operation are: "(1) the frequency of the bony lesion in the middle fossa; (2) the fact that contusions are especially liable to involve the tip of the temporal lobe; (3) the exposure of the meningeal territory and ease of determining the presence of an extradural hemorrhage; (4) the possibility of draining through split muscles rather than through the scalp, and (5) subsequent protective action of the muscles in case a hernia tends to form in consequence of traumatic edema."

It is not my intention to hold out the spinal tappings as the ideal method of treatment in all cases. My ten cases will not

permit me to do this, but I do claim that this plan of treatment is well within the reach of all of us, and that if done repeatedly and enough fluid is withdrawn, the intracranial pressure will be relieved and much good will follow. It is really a spinal decompression and drainage and in selected cases, and, where there is no blockage at the foramen magna, the spinal pressure will be relieved and subsequently the intracranial pressure too.

I have made an invariable rule always to do a spinal puncture in all head injuries, whether a fracture was suspected or not; it will do good in concussions, contusions, or basal fractures. In no one of the 10 cases did I puncture less than three times, and in three of the severe cases I punctured six times. I have removed at the first tapping as much as 30 c. c.; this is according to all the authorities contra-indicated, because the release of the spinal pressure might invite the increased intracranial pressure to force the medulla into the foramen magnum and sudden death ensue. Fortunately, I have had no such accident, and in the 10 cases I have done 43 punctures.

All of the cases recovered; in two, because one had a permanent impairment in the right optic and the other a most annoying dizziness which only gradually improved, do I feel that the decompression operation would have given perhaps better results. I believe that in the treatment of these cases we must not look solely to the life-saving measures, but also to means that will insure better end results, and I feel that I erred in not decompressing these two cases.

One of the cases I punctured seven times, twice in the first twenty hours. I removed 32 c. c. at the first and 30 c. c. at the second puncture; this boy, though unconscious and running high temperature for seven days, made an excellent recovery with no apparent lesions.

I believe that William Sharpe has taken the proper stand in these cases, and the treatment advocated by him I am in the future going to follow. He claims that the majority of basal fractures, in fact two-thirds of all cases, do not have an increase of intracranial pressure, as registered by the spinal mercurial monometer, of more than 12-14 mm., and as long as this is true, spinal punctures will suffice and that decompression

operation is unnecessary and only an added risk. But should the pressure register over 16 mm., a decompression should be done, and should be done right off. There is a certain proportion of cases that will get well if let alone. There is no question that the decompression operation has increased a proportion that would have succumbed without operative intervention. If I will have been a means of further suggesting the spinal puncture as a procedure to increase this proportion, I feel that I have done something.

DISCUSSION.

Dr. Urban Maes, New Orleans: Dr. Crawford has opened for discussion a most important field of surgery. The compilation of figures on fractures of the skull and the classification of them should be changed, not only as regards the fractures, but also the cranio-cerebral injuries, because of the incidence of cerebral injuries, where there are no signs of fracture.

With reference to relieving pressure, we have, by means of the suggestions of Sharpe and others, methods of determining the amount of pressure, and do not treat patients as we did in the past, on the expectant plan. We thought the way to do was to put these patients to bed, to give them bromides, apply an ice cap and wait. But these patients showed up later with a great many phenomena traceable to the original accident.

The decompression operation of Cushing, with a single straight temporal incision, which admits of good subsequent closure, performed at the proper time, is a life-saving operation and, I believe, should be bilateral in most instances where any operative procedure is indicated.

The phenomena that show themselves are all pressure phenomena. We know of very few cases where there is great injury of the brain substance itself. The symptoms that occur are reactionary in character and due entirely to the failure of the cranial cavity to accommodate itself to the swelling of the brain. Since the cranium will not yield when reactionary swelling occurs, we are bound to have pressure phenomena. On this fact alone we base our treatment, which is a subtemporal decompression.

Sharpe gives interesting figures of 250-odd cases which show that by carefully observing his patients and being guided by two particular phenomena, the registration of pressure of the spinal fluid by a mercury manometer, watching for choked disc and papilledema, as indices for operation, sifted his cases down to only 76 that needed surgical intervention. In these 76 cases his mortality was 30 per cent. In collecting the statistics of other places where no operation was done, and the old expectant plan was adopted, the mortality was well over 50 per cent.

I think one word of caution is necessary, and that is: when to operate on these patients. In tracing them back we can see a rather high mortality that is our fault in many instances, because we had not learned to differentiate the symptom-complex of brain injury from that of surgical shock. I think it is wise to observe these cases always for just six hours, at the end of which time, after making careful observation and the patients have recovered from shock, it is time to operate. If we do not operate while the

patient is free from shock, we will increase the mortality tremendously.

I believe spinal puncture is an extremely valuable procedure, but I think where we do not have the means of differentiation of the degree of cortical pressure by the manometer and by the cooperation of the competent ophthalmologist, it is far safer to decompress than to let these patients get along with spinal puncture. Sharpe's observations make a difference of degree in the severe cases where he decompresses, and in mild cases where he depends upon spinal puncture.

I merely want to add that this is an extremely important subject. We see many industrial accidents with head injuries, and the subject ought to be sifted out. We have attempted to standardize, in our accident work, and it has been our aim to watch these patients for shock, observe them at the end of six hours, and if they show slowing of the pulse, a slow respiration, with a mild papilledema, we decompress. If the symptoms are mild, we resort to spinal puncture. Decompression can be done under local anesthesia in most cases. I have one patient who showed compressive phenomena at the age of eleven days, due to an obstetric injury, showing local epilepsy, which became gradually generalized, and I decompressed under local anesthesia. If we can do it in an eleven-day-old baby, we can do it with an adult, and it is another factor of safety in the operation.

Dr. William M. Perkins, New Orleans: There are three points to which I desire to call attention. I would like to have Dr. Crawford tell us what precautions he uses to avoid the too rapid withdrawal of the cerebro-spinal fluid. Thirty c. c. is a fair amount, is it not? I think someone should add a word of warning pertaining to that, the too rapid withdrawal of cerebro-spinal fluid in cases where the intracranial tension is high is very apt to be followed by some herniation from the foramen magnum.

Dr. Crawford said he has not had any deaths. He may be lucky or careful. We should not recommend spinal puncture unless precautions are taken against the too rapid withdrawal of the cerebrospinal fluid.

Dr. Maes is enthusiastic about decompression. In the city of New York, at the Mt. Sinai Hospital, which is a refuge for disabled and chronically ill, with a neurological hospital, where many decompressions have been done, I saw patients there by the dozens, most of them in wheel chairs. One man, I recall, had a cerebellar hernia as big as half a small cocoanut on the back of his neck and tumors of the same size over the temporal region were common. The late end results of decompression in that institution were such as to force one against recommending the operation as easy and safe. The end results are paralysis and imbecility, as I saw them by the dozens. This work in New York is done by a neuro-surgical group of men who are very competent.

A third point is with reference to the matter of getting a compression pulse in these cases with compression symptoms. I was fairly well familiar with this thing in the Army. Men would be brought in with head injuries, with slow pulse, and some enthusiastic confrere wanted to operate at once. A pulse of 64, with great tension, called for an operation, according to some of my confreres. I was called out at 2 o'clock in the morning on a cold night to operate on a man with a pulse of 64. He recovered without operation, except he had deafness in one ear, and I do not believe a decompression operation would have made any material

change. When the pulse is down to 50, in my experience, it is not a serious indication for decompression. I have had a number of cases with the pulse running below 50 that were treated by the let-alone plan, and so far I have had no reason to change my opinion. The results have all been good.

To repeat, I would emphasize the three points to which I have called attention, namely, the danger of too rapid withdrawal of the cerebro-spinal fluid, the ease of decompression at the time, and the terrible end results a few years later. The pulse may go down to a very low point without the patient being in danger of death.

Dr. Isidore Cohn, New Orleans: Dr. Perkins' discussion reminded me of the story that is told of Sir William Macewen and Sir Victor Horsley. On one occasion they presented their experiences in brain surgery before the Royal College of Surgeons. Sir Victor Horsley had an array of brain specimens and said, "Gentlemen, these are the brains of fifty patients on whom I operated." Sir William Macewen then said, "Will you open the door please, and invite those fifty gentlemen to come in?" "These, gentlemen, are my results from brain surgery, these fifty living patients." **It is better to have a patient well from a decompression at the end of eight years than a dead patient.**

Dr. E. Denegre Martin, New Orleans: These cases, as reported, will no doubt add materially to the results in connection with this work. Dr. Crawford did not say whether all his patients are living or not. That is important, in that it will give us a better idea of his final results.

Dr. L. B. Crawford, Patterson (closing): I stated that my patients were living. I did not report them in detail, because even in a small series of 10 cases the reports would run something like this: male, white, 24 years of age, five feet four in height, etc., and I did not want to tire you with such details.

In these cases the usual symptoms were present. I have made a fair diagnosis in each one of the ten cases. The cerebro-spinal fluid was bloody in each instance, there was a slow pulse, and hemorrhages from one of the orifices.

I think Dr. Maes has given us a very good discussion. We have got to treat intracranial pressure, and we have to do it either with a hollow needle or with decompression. It is up to us to decide which we are going to do, and which is the more serious. I believe decompression is the more serious, although it gives better end results. I said that in my paper.

In answer to Dr. Perkins, in one or two cases I had to get out of the way on account of the great tension from the cerebro-spinal fluid, and if I had not done so when I inserted the needle I would have been knocked out of the way. In spite of what authorities have said, I took out 30 c. c. to 35 c. c. at one time, and the 10 cases are living. I could bring them here and you could talk to them, if necessary.

In answer to Dr. Perkins about seeing a handful of brains sticking out on the side of the head. I will say that is because the Harvey Cushing typical subtemporal decompression has not been adhered to. I have done decompression with flaps up here (indicating) and decompressions on the parietal bone with nothing to protect it but the skin. But if you do a typical Harvey Cushing subtemporal decompression you will get good support, and you are not so apt to have a hernia. In every one of the cranial cases the pulse comes down until you wonder how much further it is going down. It is going down in some cases until it stops.

REPORT OF A CASE OF TETANY AFTER THE THIRD PARTIAL THYROIDECTOMY.*

By HERMANN B. GESSNER, M. D., New Orleans, La.

I have thought it worth while to make a brief report of this case because of the severity of the symptoms as well as because of the general interest of the particular case.

The literature of post-operative tetany conveys the idea of a temporary and mild condition; the symptoms in the case in question were anything but mild or temporary.

Miss J. O. was operated on for the first time at Touro Infirmary, July 17, 1915; she was then seventeen years old, and presented a large goitre, with marked exophthalmos and a rapid pulse; Dr. Urban Maes performed a symmetric wedge-shaped excision. There was decided reaction, with temperature 104° and a pulse of 150. Primary union followed. The patient left the hospital nearly three weeks later, feeling much less nervous; the pulse rate had been lowered by fifteen to twenty beats to the minute. Two years later, her condition having grown worse, she was readmitted. Between July 27, 1917, and September 29 of the same year, a period of about two months, she received four boiling water injections into the enlarged gland, two of these made by Dr. Maes, two by the writer after Dr. Maes had left the city on military duty. This treatment did not relieve the patient. Some months later, in February, 1918, the writer removed the right lobe of the thyroid, this being the second operation. In the following fall the patient, not at all discouraged by the previous experience of two operations and four boiling water injections, returned for further treatment. She complained especially of great muscular weakness, which made it impossible for her to perform any household duties. Finally, on September 3, 1918, more than three years after the original operation, the third partial thyroidectomy was performed by me. While the two previous interventions had been under general anesthesia, this was undertaken with local anesthesia; four ounces of one-half per cent Apothesine were used with Adrenalin. The superior thyroid vessels were ligated; a portion of the left lobe was removed, at its superior pole, without encroaching on the posterior aspect of the gland. The immediate post-operative course was uneventful. Three days later, on the fourth post-operative day, the patient complained of a strange feeling in the hands; next day this feeling was defined as one of numbness. On the eighth post-operative day she complained of numbness and stiffness in the hands and feet, as well as of great nervousness. On the ninth day there was vomiting, followed by a general convulsion, with loss of consciousness; later, the muscles of the hands and feet were seen twitching. Examination at this time showed the presence of Trousseau's sign of tetany, pressure on the vessels and nerves of the upper extremity causing the appearance of the so-called obstetric hand, the thumb folding into the palm and the fingers closing over it. Chvostek's sign, contraction of the facial muscles on tapping with a pencil along the course of the seventh nerve, was also present. Calcium chloride was given in ten-grain doses, three times daily. On the eleventh day there was another convulsion, the

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duration of which was four minutes. At this time 100 cc. of five per cent calcium lactate solution were given intravenously. Between September 11, the ninth day, and October 20, the thirty-ninth day after operation, there were seven convulsions, The treatment consisted in part of intravenous injections of calcium lactate solution, from 100 to 150 cc. of a five per cent solution, administered after the occurrence of a convulsion. In the intervals between the convulsions, calcium chloride was given in quantities ranging up to ten grains every four hours. Parathyroid tablets were also given for a time up to ten a day for a period of sixteen days, during which three convulsions occurred. Following the last convulsion of this period, that of Oct. 20, the last injection of calcium lactate was given on Oct. 22. Two days later the patient was put on a form of treatment which appeared to control the convulsions, a combination of calcium chloride and sodium bromide. This combination in doses of twenty grains each, three times a day, the patient has taken from October 24, 1918, up to the present time. The only convulsion noted in this period took place a little over a year ago after several days of trial of a reduced dose, half of the above mentioned dose. A prompt resumption of the regular dose was ordered, with the result that no more convulsions have occurred.

The final result in this case, after many difficulties, has been satisfactory. The young lady, compelled by the death of her mother to assume the care of a household, including several younger children, has been able to meet her obligations without injury to herself. She does the kitchen work and housekeeping in general, eliminating only the heavier washing. She finds it possible to attend a church situated at a distance of a half mile from her home.

In considering this case, the question arises, "What did the last operation do to bring on tetany?" Quite certainly, it brought on a parathyroid hypofunction, possibly by removing parathyroids imbedded in the portion of the left lobe removed. It may be that removal of the right lobe, although carried out with a view to preserving the parathyroids, removed some of this tissue and brought the patient near to a condition of hypofunction, the third operation proving the last straw. Trauma to the circulation is given by writers as an important cause of tetany; the ligation of the superior thyroid vessels under this theory would explain the untoward results of the final operation. It may be well to mention that at no time was there any gastro-intestinal disturbance to explain the pathologic parathyroid function.

When we come to consider the therapeutics of the case, there is much room for speculation. Why did the parathyroid medication fail? And why did the calcium chloride fail until com-

bined with bromide? This feature of the case may suggest to some the existence of a previous epileptic tendency. Careful and repeated questioning, both of the intelligent patient and of her parents, has failed to elicit the occurrence of any previous convulsion at any time in her life before the third operation.

These questions must for the present remain unanswered. I must content myself with warning against excessive confidence in repeated operative interventions in goitre, especially against the danger attendant on circulatory disturbance. Possibly the therapeutic experience will be of assistance in similar cases.

DISCUSSION.

Dr. H. P. Jones, New Orleans: I think Dr. Gessner is probably correct in making the statement that his patient was suffering from a hypothyroidism at the time of the third operation. He was clinically unable to determine that fact, which goes to prove the absolute necessity of making a basal metabolism determination in all cases of thyroid that are to be treated in any manner or are to be operated on, because the basal metabolism determination of this case before the second operation might have shown that it was a case of hypothyroidism. I say might have been. It would have been shown if it had been a case of hypothyroidism. The basal metabolism determination is one that is easily made, and I think that eventually it will become so generally known that if a surgeon operates on a case of thyroid disease without having made the necessary investigation as to the degree of secretion of the gland he might, if he gets into trouble, be subjected to some embarrassment.

I have watched the development of basal metabolism apparatus of various kinds, and I want to ask you in making your basal metabolism determinations not to make them so simple as to be unreliable. Basal metabolism determination is easily performed, the technic is definite and has to be carried out. The advantage of basal metabolism observation is that it helps to decide whether to operate or not, and also aids in the therapeutic care of the case.

Dr. Allan Eustis, New Orleans: Regarding the question of tetany, the experiments of Berkeley and Beebe are interesting as being in line with Dr. Gessner's paper and his experience in this case. They found that one or two parathyroids may be removed from dogs or cats and they will not develop tetany. If about three-fourths of the gland was removed they will promptly develop tetany. Those dogs or cats that did not develop tetany on removal of the two glands, if fed meat, developed tetany, but not if they were kept on a vegetable diet. This is of interest from a dietetic standpoint.

I saw quite a few of these cases in Vienna, where the condition is much more common than in this country. Certainly, we know that there is a tendency toward an increase in the non-protein nitrogen of the blood. These cases did better individually on a low protein diet. Why, we do not know. Some experimenters have claimed

that the toxemia is due to an accumulation of carbonic acid; others that it is due to an accumulation in the blood of oxalic acid, and that is why calcium salts are beneficial. There have not been any definite experiments to determine what is the cause of the tetanic convulsions. At any rate, from the experiments of Te Harra a low protein diet is indicated.

Regarding the calcium in Dr. Gessner's case, his dose was too small. You must remember that any soluble calcium salt, when it comes in contact with the carbonic acid radicle, forms insoluble calcium carbonate, and if we would obtain any results from calcium by the method described it must be given in sufficient amount to more than satify the sodium bicarbonate in the duodenal contents. Our practice is to give 30 grains of calcium lactate, four times a day, and in some instances even five, and certainly it does control the convulsions if given in sufficiently large doses. I think the explanation in Dr. Gessner's case was that it was not given in sufficiently large doses.

Dr. H. B. Gessner, New Orleans (closing): I wish to endorse what Dr. Jones said about the importance of basal metabolism. I think it is interesting to see how its study is broadening the field of the application of chemical and physical methods to clinical medicine. When this patient was under my observation we had no means of determining basal metabolism. If I am correctly informed, it is only within the last six months, possibly within the last year, that an apparatus for that purpose is in our city.

About the question of possible hypothyroidism in this case, I will say that the patient was strongly hyperthyroid. She had a marked exophthalmos, rapid pulse, muscular tremor, sweats, and so on. I did not go into these details in my paper. I simply mentioned the fact that she was strongly or highly hyperthyroid. There was no evidence of hypothyroidism.

Another point which I did not mention in my paper was that for a portion of the time, when she was getting parathyroid, she was also getting thyroid; this did not seem to make any difference. There is no question about her having been a hyperthyroid case.

As Dr. Eustis says, it may be that more of the lime should have been given. When I gave her an intravenous injection she got 150 c. c. of five per cent solution, which would not be very much, only seven and a half grams, or 105 grains, at a time. These intravenous injections were given once a week or every ten days. It is possible that a larger quantity of calcium in the beginning would have done more good. She is comfortable on 60 grains of calcium chloride a day with the bromid. It is possible she may get along with the bromids. But she has had so much trouble that I have not been anxious to experiment on her.

NEWS AND COMMENT.

THE MEDICAL REVIEW OF REVIEWS will issue in January an unusual number, and a copy will be sent as a New Year's gift to practically every physician in the United States and Canada. We trust the REVIEW will meet with success in its undertaking.

THE UNITED STATES PUBLIC HEALTH SERVICE will hold examinations for entrance into the regular corps on November 14, at Washington, D. C., Chicago, Illinois, and at San Francisco, California. Candidates must be between twenty-two and thirty-two years of age and graduates of a reputable medical school. They must pass satisfactorily oral, written and clinical tests before a board of medical officers. Successful candidates will be recommended for appointment by the President. Requests for information or permission to take this examination should be addressed to the Surgeon General, U. S. Public Health Service, Washington, D. C.

THE LAFOURCHE VALLEY MEDICAL SOCIETY met on August 9 at the home of the President, Dr. W. E. Kittredge, with a large attendance. Dr. J. J. Ayo read a paper on The Treatment of Dislocation of the Lower Jaw; Dr. D. T. Martin reported a case of Granuloma Inguinale, and Dr. R. W. Collins presented a paper on Pyelitis. Dr. Marion Souchon, of New Orleans, a guest of the Society, gave a practical talk and demonstration on the most efficient and practical way of repairing tears immediately after labor.

THE AMERICAN PUBLIC HEALTH ASSOCIATION will hold its fiftieth annual meeting from November 8 to 19, in New York City, using the occasion as a Health Fortnight, which will include three major divisions: a Health Institute, November 8 to 11; a Health Exposition, November 14 to 19; also the meeting of the Association proper, November 13, will be observed as Health Sunday. The New York County Chapter of the American Red Cross and the Department of Health of the City of New York will co-operate with the General Committee of the Association, and it is expected that representatives from all States in the Union and from many foreign countries will participate in the extensive program which is being prepared. For

further information regarding the meeting, and for exhibition space for educational, philanthropic and commercial exhibitors producing health articles of value, address the American Public Health Association, 370 Seventh Avenue, New York City.

THE ALVARENGA PRIZE award of the College of Physicians of Philadelphia will be made on July 14, 1922, provided that an essay deemed by the Committee to be worthy of the prize shall have been offered. The prize is about three hundred dollars and is the income for one year on the bequest of the late Señor Alvarenga. Essays intended for competition may be upon any medical subject, but cannot have been published. They must be typewritten, and if written in a language other than English must be accompanied by an English translation. The last date at which essays may be submitted is May 1, 1922. No signature must appear, but essays must be plainly marked with a motto and be accompanied by a sealed envelope having on its outside the motto of the paper and within the name and address of the author. It is a condition of competition that the successful essay or a copy of it shall remain in possession of the College; other essays will be returned upon application within three months after the award. The Alvarenga Prize for 1921 has been awarded to Dr. John W. Churchman, New York City, for his essay entitled "Selective Bacteriostosis of Gentian Violet" For details regarding the Prize, address Dr. John H. Girvin, Secretary, 19 South 22nd Street, Philadelphia.

A PRIZE of $100,000 has been offered by an anonymous donor through the Cosmopolitan Cancer Research Society of Brooklyn for the discovery of a medical remedy to relieve cancer, such a reward to be known as the Cosmopolitan Cancer Prize, and has been made in anticipation of the observance of National Cancer Week, October 30 to November 5. Requirements of the award call for method of treatment, formulas and full information, with therapeutic proof in at least fifty cases.

THE FRANCISCAN SISTERS, who have a hospital at present in Monroe, Louisiana, are endeavoring to raise $30,000.00 for the erection and establishment of a hospital in Baton Rouge.

THE SECTION IN NEUROLOGY AND PSYCHIATRY of the Southern Medical Association will hold its first annual scientific

session at Hot Springs on November 14. An elaborate program has been prepared, divided into two parts, one devoted to Psychiatry and the other to Neurology. A number of interesting papers will be presented and considerable discussion is to take place.

THE NEW YORK MORTALITY RECORD for the week ending September 23rd is the lowest ever experienced by that city, only nine hundred and sixty-seven deaths having been recorded with a date record of 8.77 per thousand of the population. Poliomyelitis is on the increase, however, as the number of cases of this disease reported for the week of September 24th was the largest recorded since the epidemic of 1916.

THE AMERICAN MEDICAL ASSOCIATION OF VIENNA has been re-established and some of the old functionaries have again taken up their offices. It is hoped that within a short time there will be a return to the old conditions exisiting prior to the war, when the Association was of excellent service to all English-speaking students in Vienna.

MANSFIELD AND RICHLAND COUNTY, in Ohio, have been selected by the National Health Council as the scene for the demonstration of what can be done by Americans in developing the health of their children. The choice has fallen in these places because it is believed that they best complied with the qualifications set down by the Council for the purpose of securing a typical American Community. It will take five years to complete the experiment and children of all ages will be included. The program will be so comprehensive and well balanced that it will be of use to communities all over the country.

SUICIDES ON THE INCREASE IN GERMANY. Quoting from the *Medical Record*, we find the following statement: "Of the persons who committed suicide in Germany before the war one-third were women. During the war exactly as many women as men took their lives. In 1919 the number of men who committed suicide increased, while the number of women was the same. There were considerably fewer suicides in the Southern regions than in other parts of the country."

THE ROYAL AIR FORCE MEDICAL SERVICE has been organized in Great Britain and regulations governing it formulated. This

Service should prove attractive and interesting to medical men, as it opens up a career which should provide much scope for research, including as it does opportunities for both permanent and short term officers.

THE CAUSE OF STAMMERING. A recent report on a survey of children in London afflicted with stammering has been made, showing that of a total number of disabilities there were 914,682 boys and only 232 girls. Frights of various kinds and night terrors were associated with many of these. Poor chest development seemed to enter as a large factor in many cases. For those who have believed that left-handedness often accompanies stammering, it may be cited that this condition was found in only thirteen cases. The report showed that in a total number of 275 cases treated in 1920 with a view to the development of the chest, 106 were cured of stammering, 61 left before cured, and 108 were still in attendance at the end of the year.

FATHER OF THIRTY-TWO CHILDREN EXHAUSTS NAMES. Disclaiming all responsibility for its authenticity, we quote the following from a New Orleans newspaper: "A. B. Burgess, a Savannah negro, probably has the largest family in Georgia, being the father of thirty-two children and having had three wives. Twenty-six children are living happily in the suburbs. Seven sets of twins and two sets of triplets blessed this negro. The oldets son is thirty-five, and he and four other members of the family are married, giving Burgess many grandchildren. When the last set of twins was born Burgess and his wife had run out of names and they grew up nameless, selecting their own names when they entered public school. Burgess shied at selecting names when he found that among his progeny he had been doubling up, having two "Willies" and two "Sallies."

PERSONALS: Dr. A. A. Keller announces that his practice is limited to the Diseases of the Ear, Nose and Throat, with offices at 1215 Maison Blanche building; hours 3:00 to 5:00 P. M., and morning hours by appointment.

Dr. J. W. Newman and Dr. Walter E. Levy announce their association in the practice of Gynecology and Obstetrics, with offices at 3523 Prytania Street, and office hours 11:00 to 12:30 and by appointment.

Dr. David Walley has been appointed Superintendent of the Mississippi State Charity Hospital at Vicksburg.

REMOVALS: Dr. George C. Anthony from Tioga to Guaranty Bank Building, Alexandria, Louisiana.

Dr. W. H. Knolle from Medical Building, New Orleans, to Mason, Texas.

Dr. R. E. Ellzey from Goss to Pleasant Hill, Louisiana.

Dr. J. H. Landrum from Jamesboro to Alexandria, Louisiana.

The following changes in offices are announced by New Orleans physicians:

Dr. George S. Bel from the Medical Building to Suite 1600 New Hibernia Bank Building.

Dr. Robert Bernhard from the Medical Building to Suite 1600 New Hibernia Bank Building.

Dr. J. D. Bloom from 1215 to 1122 Maison Blanche Building.

Dr. C. L. Brown from the Touro Infirmary to No. 1902 Canal Street.

Dr. Arthur Caire, Sr., and Dr. Arthur Caire, Jr., from the Medical Building to No. 3435 Prytania Street.

Dr. Frank Chetta from No. 3057 St. Claude Avenue to No. 935 Esplanade Avenue.

Dr. G. F. Cocker from No. 710 to No. 1105 Maison Blanche Building.

Dr. C. G. Cole from Maison Blanche Building to Suite 1500-1510 New Hibernia Bank Building.

Dr. R. A. Davis from Medical Building to No. 3435 Prytania Street.

Dr. L. DePorter from No. 208 to 408-10 Medical Building.

Dr. George J. DeReyna from No. 3529 to No. 3088 Prytania Street.

Dr. Roy B. Harrison from Maison Blanche Building to Suite 1500-10 New Hibernia Bank Building.

Drs. Henriques and Menville have removed their X-ray and Radium Laboratory from the Maison Blanche Building to Suite 1600 New Hibernia Bank Building.

Dr. F. J. Kinberger from 636 Common Street to 3437 Prytania Street.

Dr. J. B. Larose from 621 Macheca Building to Suite 1320 Whitney Annex.

Dr. J. A. Lewis from the Cusachs Building to 1109 Maison Blanche Building.

Dr. J. L. Locascio from 1226 Elysian Fields Avenue to 35 Morgan Boulevard.

Dr. A. Mattes from 636 Common Street to 204 Medical Building at 124 Baronne Street.

Dr. Monte F. Meyer from the Medical Building to 3435 Prytania Street.

Dr. Caroline Mims from the Medical Building to 504 Title Guarantee Building.

Dr. A. Nelken from the Medical Building to 502 Title Guarantee Building.

Dr. W. D. Phillips from the Maison Blanche Building to Suite 1500-1510 New Hibernia Bank Building.

Dr. P. L. Querens from Cusachs Building to 1109 Maison Blanche Building.

Dr. W. A. Reed from the Medical Building to 502 Title Guarantee Building.

Dr. J. W. Rosenthal from Maison Blanche Building to 4026 St. Charles Avenue.

Dr. R. E. Stone from 636 Common Street to 3437 Prytania Street.

Dr. H. W E. Walther from Macheca Building to 1321 Whitney-Central Building.

Dr. R. C. Voss from 1105 Maison Blanche to 1313 Whitney-Central Building.

MARRIED: On October 8, 1921, Dr. G. G. McKellar, of Couchwood, Louisiana, to Miss Lillian Smith, of Northern Copiah.

On September 20, 1921, Dr. George J. DeReyna to Miss Marguerite Tujague, both of New Orleans.

On October 12, 1921, Dr. W. A. Knolle to Miss Helene O. Friedrichs, both of New Orleans.

DIED: On October 3, 1921, Dr. J. W. Cockerham, Confederate Veteran, died at Natchitoches, Louisiana, aged eighty-four years.

MORTUARY REPORT OF NEW ORLEANS.

Computed from the Monthly Report of the Board of Health of the City of New Orleans, for September, 1921.

CAUSE.	White.	Colored.	Total
Typhoid Fever	2		2
Intermittent Fever (Malarial Cachexia)	1	2	3
Smallpox			
Measles			
Scarlet Fever			
Whooping Cough	3	1	4
Diphtheria and Croup	2		2
Influenza	1		1
Cholera Nostras			
Pyemia and Septicemia			
Tuberculosis	22	29	51
Cancer	38	9	47
Rheumatism and Gout	2	3	5
Diabetes	3		3
Alcoholism	1		1
Encephalitis and Meningitis	1	1	2
Locomotor Ataxia			
Congestion, Hemorrhage, Softening of Brain	16	16	32
Paralysis	1	1	2
Convulsions of Infancy			
Other Diseases of Infancy	18	12	30
Tetanus			
Other Nervous Diseases	5		5
Heart Diseases	57	35	92
Bronchitis			
Pneumonia and Broncho-Pneumonia	20	11	31
Other Respiratory Diseases	3		3
Ulcer of Stomach		2	2
Other Diseases of Stomach			
Diarrhea, Dysentery and Enteritis	9	6	15
Hernia, Intestinal Obstruction	3	2	5
Cirrhosis of Liver	1	4	5
Other Diseases of the Liver	3	1	4
Simple Peritonitis			
Appendicitis	9	5	14
Bright's Disease	23	9	32
Other Genito-Urinary Diseases	7	6	13
Puerperal Diseases	8	5	13
Senile Debility	3	2	5
Suicide	7	1	8
Injuries	16	20	36
All Other Causes	24	22	46
Total	309	205	514

Still-born Children—White, 24; colored, 22. Total, 46.

Population of City (estimated)—White, 290,000; colored, 110,000. Total, 400,000.

Death Rate per 100 per Annum for Month—White, 12.78; colored, 22.36. Total, 15.42. Non-residents excluded, 13.26.

METEOROLOGICAL SUMMARY (U. S. Weather Bureau).

Mean atmospheric pressure	30.05
Mean temperature	83
Total precipitation (inches)	3.94

Prevailing direction of wind—South.